INVESTIGATION OF CORPS OF ENGINEERS CIVIL WORKS PROGRAM

HEARINGS

BEFORE THE

SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS HOUSE OF REPRESENTATIVES

EIGHTY-SECOND CONGRESS

FIRST SESSION

SUBCOMMITTEE ON DEFICIENCIES AND ARMY CIVIL FUNCTIONS

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PART 1

THE ENTIRE CIVIL WORKS PROGRAM UNDER CONSTRUCTION IN FISCAL YEAR 1951, COMPRISING 182 PROJECTS, INCLUDING REPORT OF COMMITTEE COUNSEL

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INVESTIGATION OF CORPS OF ENGINEERS CIVIL WORKS PROGRAM[1]

THURSDAY, AUGUST 9, 1951.

WITNESSES

LT. GEN. LEWIS A. PICK, CHIEF OF ENGINEERS
BRIG. GEN. C. H. CHORPENING, ASSISTANT CHIEF OF ENGINEERS FOR CIVIL WORKS
COL. R. E. M. DES ISLETS, ENGINEER COMPTROLLER
J. W. KIMBEL, SPECIAL COUNSEL, CORPS OF ENGINEERS
F. B. SLICHTER, CHIEF, ENGINEERING DIVISION, CIVIL WORKS
G. L. BEARD, CHIEF, PLANNING AND DEVELOPMENT DIVISION, CIVIL WORKS

Present: John J. Donnelly, Jr., Esq., committee counsel, and Fred Korth, Esq., deputy counselor, Department of the Army.

Mr. CANNON. The committee will come to order, a quorum is present. You may proceed, Mr. Donnelly.

INTRODUCTORY REMARKS OF COMMITTEE COUNSEL

Mr. DONNELLY. Members of the committee, I would like to report to you this morning the status of the national study undertaken by the committee's investigative staff of the 182 projects in the civil-works program, that is, civil-works projects in the construction program of the Corps of Engineers, for fiscal year 1951.

The committee last year filed a report with the House, dated March 21, 1950, report No. 1797, Eighty-first Congress, second session, pointing out that certain matters in the Corps' functioning, in the construction of civil-works projects, could bear looking into. The committee was so seriously disturbed about the matter that on March 29, 1950, it directed the investigative staff of the committee to make a comprehensive study of the policies, practices and procedures of the Corps of Engineers.

The report of the committee staff was made to the committee on January 23, 1951, and was turned over by the committee on April 3, 1951, to the Chief of Engineers, with the request that he prepare within 2 weeks such comments thereon as he might deem appropriate.

The Corps of Engineers sent its formal answer to the committee on April 16, 1951.

In May, this past May, the committee had hearings on the proposed Tennessee-Tombigbee waterway, and in the course of those hearings there was considerable testimony with regard to the status of planning on the part of the Corps of Engineers for civil works projects.

[1] These hearings commenced in May 1951. The first phase dealt only with one project, the proposed Tennessee-Tombigbee Waterway, which will be published as pt. 2 of these hearings. This phase deals with all 182 projects in the Corps' construction program for fiscal year 1951. (The proposed Tennessee-Tombigbee Waterway was not in this program.)

Recognizing that the issues created by the committee staff report and the corps' answer were so broad and yet so specific in detail that hearings thereon in full would be difficult for the committee and for all concerned, I engaged in a series of conferences with General Pick, General Chorpening, and other members of the Corps of Engineers, commencing in May. This series of conferences was for the purpose of getting the facts and making constructive recommendations to the committee.

General Pick, General Chropening, and all the representatives of the corps have been cooperating in that venture, and so this morning I am gratified to report to the committee that we will be able to present the facts here, and General Pick will testify with reference to certain recommendations of improvement.

These conferences were attended, at the direction of the Secretary of the Army, by Fred Korth, Esq., deputy counselor of the Department of the Army, who is here this morning, and Mr. Harold Pearson of the Office of the Assistant Secretary of the Army for General Management.

At the conclusion of these conferences, by virtue of an arrangement which I had made with Mr. Korth, I crystallized in a report the facts as we have developed them and the procedural improvements that I would suggest to the committee. Yesterday this report was reviewed by Mr. Korth and representatives of the corps. It is printed in full below, commencing at page 67.

I understand that General Pick has been very intensively engaged in his duties, particularly because of the Kansas flood situation, and that he has to go to Europe tomorrow on a military tour which will occupy him until the 24th of August.

These introductory remarks have been made to bring the committee up to date as to what we have accomplished.

Mr. Korth, before we proceed, is there anything you want to add to the statement I have just made?

Mr. KORTH. I think you have covered it very well. There is one point I want to make, which I am sure was not omitted intentionally, and that was that the date on which the report was submitted to the Corps of Engineers. From the statement you made it might appear that they may have had it some 6 months, when as I understand it was some 2 weeks.

Mr. DONNELLY. I think I gave the date as April 3, 1951, as the date that this committee turned it over to General Pick, and the corps' formal answer was filed 13 days later, on April 16, 1951.

Mr. KORTH. Yes.

SCOPE OF INVESTIGATION MADE BY COMMITTEE STAFF

Mr. DONNELLY. At the outset I would like, if I may, to invite the committee's attention to a map here on the easel which shows the projects which were studied in the field by the investigative staff of the committee, so that the committee will be aware of the scope of the investigation.

In the Columbia River Basin the committee visited McNary project, Lookout project, Detroit project, Lucky Peak project, and Willamette Falls lock, all in this area [indicating].

Down below, in California, on the Sacramento and San Joaquin Rivers: Pine Flat, Folsom, Isabella, and Farmington projects;

In the Missouri River Basin: Oahe and Fort Randall projects;

In the Ohio River Basin: Dillon Reservoir and Dewey Reservoir;

In the Cumberland River Basin: Wolf Creek project, Center Hill project, Cheatham lock and dam project, and lock No. 4, Cumberland River;

In the Arkansas River Basin: Port Gibson project, and Tenkiller project;

In the Apalachicola River Basin: Jim Woodruff project and Buford project;

In the Ouachita River Basin: Blakley Mountain project, and Narrows project;

The Brazos River Basin: Whitney project; and

In the Trinity River Basin, Tex., Benbrook project.

These projects were actually under construction at the time the investigators of the committee visited them. The total amount involved in the construction, $1,422,686,900.

The investigative staff consisted of engineers, accountants, and investigators. They visited the field offices of the Corps of Engineers, that is, 3 division offices, and 10 district offices, and the staff members analyzed in each district two or more civil-works projects and examined the general practices and policies of the corps in the field of civil works.

These analyses and examinations embraced a study and review of files, records, and reports, discussion with corps' personnel, and field trips to the construction sites of several projects. The projects which I identified and which the investigative staff studied total 25, which involve an estimated cost of approximately $1½ billion 1951 construction costs.

In addition, the staff reviewed and discussed with corps' field personnel the bulk of all projects then under construction in each of the offices visited. The 10 district offices visited were supervising the construction of projects having an estimated cost of $2.9 billion, which represented approximately 50 percent of the total estimated cost of the projects comprising the fiscal year 1951 program, which was approximately $6 billion.

Mr. KERR. How long did the investigation take?

Mr. DONNELLY. Judge—from March 29, 1950, until January 23, 1951.

TESTIMOMY OF LT. GEN. LEWIS A. PICK—(Continued)

Now, General Pick, if I may, for the benefit of the committee, I would like to ask a few fundamental questions with reference to planning procedure. I do that because on April 3, 1951, members of this committee went into the fundamentals and I would therefore like to review with you briefly the planning procedure.

STATUTORY PROCEDURE FOR THE AUTHORIZATION OF CIVIL WORKS PROJECTS

First, General, may I ask if the present statutory procedure, leading to the authorization of projects by the Congress, is carefully regulated?

General PICK. I do not understand—carefully regulated at present?

Mr. DONNELLY. Yes; by statute. Do you want the question restated?

General PICK. No; I am trying to think about the answer. I think it is. It is regulated by statute; yes.

Mr. DONNELLY. Let me state what I understand the statutory procedure to be. First the Congress in an omnibus river-and-harbor and flood-control act directs the Corps of Engineers to make a preliminary examination or survey of a proposed project. Is that correct?

General PICK. No; that is not exactly correct. It may be in an omnibus bill, or it may be as a result of a resolution of one of the committees—the Public Works Committee of the House or of the Senate passes a resolution directing that a survey be made or a resurvey be made, or it may come in an omnibus bill.

Mr. DONNELLY. In any event, the corps, under the law, is not permitted to make a preliminary examination of a proposed project unless Congress by statute has directed the preliminary examination to be made?

General PICK. That is correct.

Mr. DONNELLY. General, when the corps, at the direction of the Congress, makes a preliminary examination it writes a preliminary-examination report.

General PICK. That is correct.

Mr. DONNELLY. The preliminary-examination report is finally sent to the Congress when completed; is that correct?

General PICK. The preliminary examination report is acted upon by the Board of Engineers for Rivers and Harbors and by the Chief of Engineers, and submitted to the Secretary of the Army. He submits it to the Bureau of the Budget. After clearance by the Budget, it is presented to the Congress.

Mr. DONNELLY. That is the preliminary examination.

General PICK. The preliminary examination?

Mr. DONNELLY. Yes; that is the initial step?

General PICK. Yes.

Mr. DONNELLY. Yes; without going into too much detail, the preliminary-examination report, if unfavorable, is submitted to Congress, as I understand?

General PICK. Yes.

Mr. DONNELLY. But the preliminary-examination report, if favorable, is furnished the Secretary of the Army who, under the statute, has the authority to direct the Corps of Engineers to make a survey report?

General PICK. Yes; but I was outlining the procedure under which the survey report gets to the Congress.

Mr. BEARD. A favorable preliminary-examination report goes to survey, upon the discretion or direction of the Chief of Engineers; it does not go back to the Secretary of the Army.

General PICK. That is correct to an extent, with respect to the favorable preliminary survey, which includes the necessary estimate of funds for survey, which we submit to the Bureau of the Budget with the information in support of the request for funds.

In other words, suppose we ask for $2 million for surveys, we go to the Bureau of the Budget with a list of surveys on which we want to spend the money. That is how it gets into the actual survey work.

Mr. DONNELLY. General, if I may cite the statute: the statute is the act of March 4, 1913, printed now as 33 United States Code, section 545, and to paraphrase the statute, it says:

In the event the preliminary-examination report made by the Corps of Engineers is favorable, the Secretary of the Army is authorized in his discretion to order a survey report made, and the cost and advisability of the project reported to the Congress.

General PICK. That is right. But we request funds through the Bureau of the Budget. You see, when we make up our estimates for next year, our budget is necessarily taken up with the Comptroller General of the Army, and they work over it, and finally it is submitted to the Bureau of the Budget and they work over it. And finally it is included in the President's budget and sent to the Congress.

But in making up the total sum for examination and surveys, we go to the Bureau of the Budget with a justification for that amount of money, and we have to show them where we are going to use it and what it is going to be used for. That is done, although the survey money might come to the Chief Engineer as a lump sum and he apportions it out on the surveys.

Mr. DONNELLY. Now, General, the survey report, when made by the Corps of Engineers, is referred to the congressional agency, the Board of Engineers for Rivers and Harbors, for its recommendation, is it not?

General PICK. When it is made by the division and district engineers it goes through channels to the Chief of Engineers. He sends it to the Board of Engineers for Rivers and Harbors for their consideration. They go into it, examine it, study it, hold hearings, and reach a conclusion with respect to that particular report.

Then it goes back to the Chief of Engineers; the Chief of Engineers then writes his report and forwards it to the Secretary of the Army.

Mr. DONNELLY. Then the Secretary of the Army formally transmits it by letter to the Congress?

General PICK. Formally transmits it through the Budget to Congress.

Mr. DONNELLY. And then if the survey report is a favorable report, Congress prints it as a congressional document, but if the survey report is unfavorable, it is not printed, with some exceptions.

General PICK. Yes.

Mr. DONNELLY. And those exceptions are where the project is of wide national interest, of some national importance; is that correct?

General PICK. Yes.

Mr. DONNELLY. General, I have here House Document No. 643, Eightieth Congress, second session, "Comprehensive Report on Central and Southern Florida for Flood Control and Other Purposes." That, General, is a survey report, is it not?

General PICK. I think so, yes. Yes; the report shows resolutions adopted by Congress May 29, 1940; October 2, 1944; October 1945; and May 28, 1946. There are several resolutions involved. And that was reported on by the Board of Engineers for Rivers and Harbors and by the Chief of Engineers. It shows a report of the Board, a report of the Chief of Engineers; submitted by the Secretary of the Army, yes.

Mr. DONNELLY. Now, as to the survey report, is that the basis upon which the project is authorized and adopted by Congress?

General PICK. That is the basis for consideration by the Congress; yes.

Mr. DONNELLY. And on the basis of such a survey report Congress in a statute adopts and authorizes the project, does it not?

General PICK. Yes. Congress takes the report, and then it holds hearings; the committee takes testimony, and that testimony, plus the report, is the record which is made by the Congress, and from that record the Committee on Public Works takes action either favorably or unfavorably. In this particular report it was favorable. The project was authorized.

Mr. DONNELLY. That is correct. And then Congress, by statute, on the basis of this survey report, formally authorizes and adopts the projects; is that correct?

General PICK. That is correct.

Mr. DONNELLY. Now, General, may I ask you this categorically: Is there any provision in the statutes with which you are familiar, which requires any report be made to the Congress on an authorized project, subsequent to the survey report?

General PICK. Subsequent to the survey report—I do not know of any. Possibly the Public Works Committee might send it back and say they want the report reviewed and it would be reviewed and come back to the committee, but once that is finally acted upon, there is no other report.

Mr. DONNELLY. General, with respect to the revision as requested by the Public Works Committee, let me cite you the statute: This is the act of March 4, 1913, now published as 33 United States Code, section 542, and that provides that a resurvey may be made of projects which have previously been reported on in either a preliminary examination or survey report, at the request of the Committee on Public Works of either the House or the Senate.

General PICK. Yes; that is correct.

Mr. DONNELLY. Now, General, members of the corps have indicated that of the preliminary examinations and survey reports about 50 percent of them are unfavorable. Would you say that is correct?

General PICK. I had a survey made 2 years ago, I think, and I believe it ran higher than that—almost 66 percent, based on the consideration of all resolutions which had been passed by Congress. There is a large percentage of them that are unfavorable, yes.

Mr. DONNELLY. And your survey shows 66 percent?

General PICK. That is right; during the whole 125 or 126 years that we have been studying them.

PLANNING OF PROJECTS AFTER THEY ARE AUTHORIZED BY CONGRESS ON THE BASIS OF THE SURVEY REPORT

Mr. DONNELLY. General, after a project is authorized by statute on the basis of the survey report, the Corps of Engineers then asks the Congress for planning funds, does it not?

General PICK. That, in general, is the practice; yes.

Mr. DONNELLY. What is the purpose of the planning funds?

General PICK. The purpose of the planning funds is to get the work in such shape, to get the whole working plans, and to get the necessary plans and specifications prepared so that work can be put under way.

Mr. DONNELLY. And is that planning that is done put in any kind of a formal document?

General PICK. No more so than any other request for funds which goes into the civil-works budget.

Mr. DONNELLY. Now, the plans which result from the funds, are they put in formal document?

General PICK. It is put in—is included in the budget.

Mr. DONNELLY. After you get the planning funds, are your engineers out in the field directed to make a report on the basis of their estimate of the cost, and is that report not put in some formal document?

General PICK. Well, the district engineer gets money, and he works up a project study and gets the plans and specifications prepared, preparatory to advertising the works; to that extent, there is a working arrangement.

Mr. DONNELLY. Let me ask you this question: whether the Corps of Engineers has not administratively prescribed the procedure requiring a definite project report to close the gap in planning between the survey report and the appropriation of initial construction funds?

General PICK. We have——

Mr. DONNELLY. The Corps initiated that procedure in 1936, I understand.

General PICK. We have, and we have at the present time that system in effect on the particular features of work that are being considered with funds available. That has been furnished the committee in accordance with instructions, the wording of which I cannot quote verbatim. I know we have a copy somewhere.

Mr. DONNELLY. I have here a copy of the regulations——

General PICK. Whatever it says. I cannot quote the exact words.

BASIS FOR APPROPRIATION OF INITIAL CONSTRUCTION FUNDS

Mr. DONNELLY. Now, General, will the definite project report provide a sound cost estimate for the total cost of the projects, upon which initial appropriation can be made?

General PICK. No; no. If we were to make a definite project report for a project in Arkansas today, that would be based upon the conditions and the cost, the conditions as found today, and the costs as found today. It would, to that extent, be a report of the cost of the work. It would not foresee changes which would have to be made on the work after it starts, and also developments which might take place on a large job, nor does it take into account any increase in the price. Other than that, it would be a fair estimate of what the work was going to cost.

Mr. DONNELLY. Now, General, will not the cost estimate contained in the definite project report provide this committee with a better cost estimate for a project than the survey report?

General PICK. Yes; the survey report estimate, as a general rule, from the time the resolution is passed for a survey until we come to Congress for funds to build the project, will run 4 or 5 years. I guess it will average 5 or 6 years.

Mr. DONNELLY. So that there is a lapse of 5 or 6 years between the survey report and the appropriation of the initial construction funds?

General PICK. I think so.

Mr. DONNELLY. General, is it not true that the survey report often does not adequately develop the engineering problems in a project?

General PICK. In the past, I have considered that it did not, and when I became Chief of Engineers one of the first things that I did was to issue instructions to the field and to my office that the engineering division of my office and in the districts and divisions take part in the planning and on the work of working up the estimates. I think they are much better now.

INFORMATION ON COST OF PROJECTS FURNISHED TO APPROPRIATIONS COMMITTEE

Mr. DONNELLY. Well, even if the survey reports are much better today, will the survey reports provide this committee with sound cost estimates upon which to appropriate initial construction funds?

General PICK. Not necessarily so. Each year, when the Chief of Engineers and the staff come before the committee in support of the budget, we bring to the committee the up-to-date information on the projects for which we are asking funds. This material—we call them data sheets—has been worked out with the committee over a period of years. The sheets have been changed. They contain much more information now than a few years ago and before the war. We use them when we appear at the hearings of the committee, and then, from that, plus other testimony, the committee gets the latest information upon the project which we are asking funds for in the budget.

In addition to that, we furnish testimony on each of the projects to the extent which the committee desires to go into the questions. I believe that is about the present procedure.

Mr. DONNELLY. Well, General, may I ask you this question: Do you feel that the present procedure of furnishing data and information to this appropriation committee is sufficient to enable the committee to decide whether or not to appropriate funds for the construction of a project?

General PICK. I do not know; I cannot speak for the committee. We have always furnished the committee with all the information they have ever asked. If we are not furnishing the committee with sufficient information, I do not feel that we are negligent, because we have not been asked for it.

I think that, as time goes on, the committees have asked for more and more information. There is very rarely a hearing where the committee does not ask for additional information of one kind or another, during the hearings on some particular projects.

I do not know how to answer that question very well. I thought we were furnishing the committee with the information that it desired.

GAVINS POINT PROJECT

Mr. DONNELLY. General, I have tried to keep the questions on a basis of developing a general background of what is going on without giving specific instances. A project considered this spring, this April, by this committee was that of Gavins Point. Colonel Potter, one of the Corps of Engineers' representatives, advised this committee on April 19, 1951, that the latest cost estimate for this project was $44,900,000. Yet, we have found that your office had at that time

information from the field estimating the cost to be $11 million more, or $55,052,000.

General PICK. I did not know that was $55 million. I know that that particular project is being studied. That particular project is being studied and analyzed from every side to try to make it a more efficient project, the most efficient that is possible to make, because it has considerable capabilities. We had at one time decided that we could develop but 80,000 kilowatts of power. But, as a result of working with the Federal Power Commission and the Bureau of Reclamation and completing our operating studies of these big dams above, we finally concluded that it may be possible to develop 100,000 kilowatts of electric energy.

Then there was a question that we thought that we would be able to put a spillway, concrete spillway, in the center of the dam. There have been extensive drillings done down the river. We thought that we had found a chalk formation in the bed of the river on which we could rest the spillway. We did find a small one. The engineers are studying that now with a view to determining whether or not it would not be more satisfactory and a much better engineering study if we should put in an off-river spillway. There is a possible basis for a change in estimate if that is increased. That has not been approved by the Chief of Engineers. That is an estimate of the district engineer and of the division engineer.

The estimate that was presented to the committee this spring had been approved by the Chief of Engineers. But, these studies are going on now. And I do not know whether the $11 million was correct, or what the additional amount was. I would be glad to have Mr. Slichter, Chief of the Engineering Division of Civil Works, go into that. We follow the recommendations of a board of eminent civilian engineers in our consideration of these problems, in considering what we ought to do.

Mr. DONNELLY. General, the figure that I had mentioned here, $55,052,000, was taken from the supplemental definite project report dated December 1950; and, as I said, I just wanted to ask questions here that would point up the planning principle through special illustration.

General PICK. Yes.

Mr.DONNELLY. That is why I am asking that question.

General PICK. It has not been approved. They made a definite project report of it, but it has not been approved by the Office of the Chief of Engineers.

Mr. DONNELLY. What I am seeking to establish is whether or not the engineers give the committee the current cost information as of the time the committee is considering the request for funds for civil works projects.

General PICK. To that extent, you might say that is true. But we have a number of studies like that, Mr. Donnelly; and, if we agreed that every one of those ideas and schemes that the field engineers work up would be acted upon, we would be changing all the time. Approved changes come slowly. We have got to weigh everything very carefully. And changes like that would have to be made by the Chief of Engineers after considering all of the factors involved. Now, we may decide that is the best thing to do, because the Federal Power Commission and the Bureau of Reclamation,

which disposes of the electric power from these projects, wants to get the maximum out of the falling water that is possible to get.

THE MISSOURI RIVER

Mr. DONNELLY. General, the Gavins Point project, on the Missouri River, is a vital project in the development of the entire Missouri River; is it not?

General PICK. Yes; it is that project which will smooth the river out and let it flow as a normal stream down below.

Mr. DONNELLY. Well, General, the benefit-cost ratio on the four large main stream reservoirs now under construction on the Missouri River is close to unity, according to the figures that I have here. Let me read them.

The Fort Peck project has a cost ratio of 1.3. The cost of the Fort Peck reservoir is estimated for fiscal year 1952 at $156,900,000.

On the Garrison project the benefit-cost ratio is only 1.2 to 1. The cost for fiscal year 1952 is $268 million.

The benefit-cost ratio for Oahe is 1.4 to 1. The cost for fiscal year 1952 is $245,900,000.

The benefit-cost ratio for Fort Randall is 1.5 to 1. The cost for fiscal year 1952 is $189,200,000.

The total cost of these projects estimated for fiscal year 1952 is $860 million, almost $1 billion.

Now, we were talking about the Gavins Point project and the need for this committee to have each year current information. General, do I understand correctly that the benefit-cost ratio for Fort Randall will drop from 1.5 to 1 down to unity if Gavins Point is not constructed?

General PICK. I cannot substantiate the figures there, but the Gavins Point project is absolutely essential to the best use of Fort Randall. It certainly will seriously affect Fort Randall. Mr. Slichter, you are familiar with that. Is Mr. Donnelly's statement correct?

Mr. SLICHTER. His statement is relatively correct. It will depreciate the value of Fort Randall, and you might say also Garrison and Oahe, if the system cannot be operated flexibly through the construction of Gavins Point.

IMPROVEMENT IN PROCEDURE FOR FURNISHING INFORMATION TO APPROPRIATIONS COMMITTEE

Mr. DONNELLY. Now, this Appropriations Committee, as I understand constitutional law, has an important function to perform in determining whether or not these projects should be constructed. That is recognized by everyone, I am sure.

If Gavins Point is so vital to the construction of projects on the Missouri River costing approximately $1 billion, and there is such doubt in planning on the part of the Corps of Engineer's as demonstrated by the figures that I read, do you not think, General, that some improvement can be made in the procedure whereby the Corps of Engineers furnishes cost estimates to this committee each year?

General PICK. Well, Mr. Donnelly, the project is necessary. The project is essential for the successful operation of that chain of reser-

voirs on the upper Missouri. The engineering problems have to be considered and the best solution worked out.

Now, you know, engineers are just like architects. They do not all want to build the same kind of structure or the same kind of building. There are many ways in which you can design and build a project. Our theory has always been, and our policy is, to build projects as simply as possible and to keep the cost down to a minimum by not including anything more than is absolutely essential for the successful operation of the project.

You know, there is another agency of Government which is always present in these river basins, and they have engineers and they go into these projects very thoroughly. They are charged with the responsibility by the Congress of not allowing any governmental agency or anybody else to destroy any of the power potentialities in these river basins. That is the Federal Power Commission.

So if you start out here and you want to build a dam, and in that you can develop so much power, they will come in and study that and study and study and finally say, "We think if you will do this and this you can get so many more kilowatts out of that site," and they will demand that you change your design so as to include in there sufficient storage to allow that to happen. That has happened at Gavins Point. Within that range I think we are talking about the same thing, sir.

Mr. DONNELLY. That is right.

General PICK. I think we are talking about the same thing.

THE FOUR MAIN-STEM PROJECTS ON THE MISSOURI RIVER

Mr. DONNELLY. General, to illustrate the principle which we are driving at here, let us take up the four big Missouri River projects. I have the figures which were furnished the committee by the Corps of Engineers. I think each one will illustrate to the committee here that which we are seeking to achieve.

GARRISON PROJECT

The Garrison project was authorized in the 1944 Flood Control Act on an authorization estimate of $105 million. That authorization estimate was predicated upon a survey report which, under the statute, was formally written by the Corps of Engineers, referred to the Board of Engineers for Rivers and Harbors, filed by the Secretary of the Army with the Congress and printed. The authorization estimate in the survey report is $105 million. The estimate for fiscal year 1952 is $268 million, which is over twice as much as the authorization estimate.

General PICK. Now, in all fairness to the report, Mr. Donnelly, just on the face of that you would say, "That is too much of a discrepancy," but if you will analyze that you will find the project and the amount of power to be developed have been extended immensely. In other words, the project over that original survey report has been changed to a great extent. That has raised the cost some.

In addition to that, cost indexes have doubled since that report was written, I think. Speaking from memory, I think that cost indexes have just about doubled since then.

So it is not as bad as just the comparison of 105 and 268 would indicate, I do not believe.

Mr. DONNELLY. Let me put it this way: It may be bad, but not that bad.

General PICK. That is right.

Mr. DONNELLY. I have here your figures. On Garrison, the difference between the authorization estimate based on the survey report and fiscal year 1952 is $163 million. Now, of that increase, price changes account for $123,650,000; authorized project extensions, $19,562,000; difference due to changed needs, $1,220,000; structural and engineering modifications, $674,000; and then the big one from the standpoint of planning, inadequacy, $17,894,000.

General, I have talked with the gentlemen in your planning branch and they have defined for the committee "inadequacies" as omissions in engineering planning. Is that correct, Mr. Slichter, or would you want to add to that definition?

Mr. SLICHTER. I did not write that definition.

Mr. BEARD. That is part of it. I think there was more to it, as I recall it.

Mr. DONNELLY. I cannot put my finger on it. Wait a minute; maybe I can. I have it here now.

This is the document written by the Corps of Engineers on June 20, 1950:

> Inadequacy of original estimates: Under this heading will be placed any items of cost increase which were plainly due to inadequacy in the first estimate. These are items which were omitted but should have been included by the estimator as distinguished from those which could not have been foreseen. Also in this category will be placed differences due to estimates made during emergency conditions, during the depression period, or during the war.

General PICK. Mr. Donnelly, that is a tremendously big project. Many things have happened up there to increase the estimates. For instance, there is the problem with the acquisition of the Indian lands. That pool comes around and follows right along one of the railroads up there, and it takes the elevator on one side of the track, and that takes all the means of the people in the town of keeping the town there.

Congress has provided that we could buy out the town and pay the people for it. There have been lots of things to increase the cost that you could not possibly have foreseen, because it required action of Congress.

Mr. DONNELLY. General, I concede that. That is why I read off the detailed breakdown.

General PICK. So I have no objection to anything you have said there. We are just discussing this thing.

Mr. DONNELLY. That is right.

General PICK. Yes.

Mr. DONNELLY. Let us take that category.

General PICK. For instance, when we started cutting the first tunnels through there, when we got in about 100 feet we had a stream of water coming in there. We had to go in. You could not possibly foresee that. Although we had drilled the place, we did not happen to hit this place. We had to go in and cut out the whole side of the hill to keep the water from coming in. All those things you cannot foresee.

Mr. DONNELLY. But that does not affect this $17,894,000. The word "inadequacy" is the key. In the definition of "inadequacy" it was conceded that unforeseen conditions are not in that category.

General PICK. That is about 6 percent of the estimate now.

Mr. DONNELLY. It is 17 percent of the authorization estimate. The survey report on which Congress authorized this project is 17 percent off because of omissions in engineering estimates. That is $17,894,000.

Mr. FORD. You can take this off the record or have it included, but is it entirely fair and accurate to consider 17 percent of the original authorization, or 17 percent of the estimated cost at the present time? I think that may be another way of putting it which might be as fair or even more equitable than 17 percent of the original estimate.

NEED FOR BETTER COST ESTIMATES FOR CONSIDERATION BY APPROPRIATIONS COMMITTEE

Mr. DONNELLY. Congressman, the corps and the committee investigators did this: They took all the 182 projects and agreed upon a weighted average for authorization estimates and then they worked up the figures showing the increase due to five categories.

I am using the 17 percent at the time of the authorization estimate to demonstrate that the survey report upon which the authorization was based was not a sound basis for this committee to consider the appropriation of first construction money. The definite project report, which is a formal document, is a sound basis, but the Corps of Engineers does not want to complete the definite project report until the project is almost completed, until construction is almost complete. There is a complete hiatus, a complete gap here, where this committee has no sound basis whatever to get the total cost of projects when it decides to initiate the construction. That is the point.

General PICK. Mr. Donnelly, this committee handles other public works. Are we remiss in the information we furnish the committee as compared to the information being furnished the committee by other construction agencies of the Government? I am very much interested in what you say. I think that the committee is entitled to information.

Mr. DONNELLY. I understand your position, General. You want to give the committee the best information that you can from an engineering standpoint.

General PICK. That is right.

Mr. DONNELLY. Because the reputation of the Corps of Engineers, the finest body of engineers in the world, is at stake in each of these projects.

General PICK. I would love to give the committee exactly what they want. I get the feeling that we are giving the committee, Mr. Chairman, less than somebody else. We should not do that. We should give the committee what they want. We should give the committee the best information possible. We should help the committee get the best information possible.

Mr. DONNELLY. That is what we are interested in.

General PICK. I do not see that there is any question about that, Mr. Chairman. That is just an honest statement of fact.

Mr. DONNELLY. But yet we find, General, that the corps has not been giving this committee accurate information in many cases. Let me quote just a few lines from the testimony on this project in April of this year. This is by Colonel Potter:

> Referring to the indicated costs on the chart, which were $158 million in 1946, $177 million in 1947, $188 million in 1948, $202 million in 1949, and $206 million in 1950—

Then Judge McGrath says this:

> Judge MCGRATH. Has not this resulted in giving the Congress, then, in prior years a distorted view of benefit-cost ratio to the money to be expended?
> Colonel POTTER. Yes, sir; it has; and the reason is bad judgment, Judge. Our judgment was not substantiated by conditions.

General PICK. Colonel Potter was talking. He made a statement there that he did not thoroughly understand what he was saying, I do not believe.

When this project was authorized, Mr. Donnelly, the Congress was not told that it would average a cost ratio of 1 to 1.5. I wrote the report myself. I think if you will get it you will find that I said in there that the project is economically justified. The project is economically justified now, even at the cost of $268 million for Garrison on a 1 to 1.5 basis. In other words, for every dollar you spend the benefits will be $1.50.

Mr. DONNELLY. To be fair with the General, your representatives formerly reported it as 1.2. That was in April of this year. Fort Randall was 1.5.

General PICK. I thought you read that. The whole Missouri Basin, as I remember it, is 1.6

Mr. DONNELLY. But that 1.6, General, under your figures, will drop to 1.3 if Gavins Point is not constructed.

General PICK. Well——

Mr. DONNELLY. I can get the figures.

General PICK. Why consider dropping Gavins Point when you have to build it?

Mr. DONNELLY. That is the point, General. This committee is the body which will decide whether or not to build Gavins Point.

I pointed out to you that before April of this year your district office had made a supplemental definite project report in which they said that the cost of Gavins Point was $11 million more than the cost reported by Colonel Potter or by the corps to this very committee in April of this year. My whole premise is that the corps, recognizing your own position, wants to give the committee better information; and we should devise some way where it will be assured.

Mr. SLICHTER. That district report was submitted to us as you indicated. It was returned, however, for additional examination of certain features, I think you will find, in the interest of economy. Our position is, Why should we introduce another inexact figure at the time when the design of the project has not been completely established?

General PICK. It is wrong, I think, Mr. Chairman, to take a project like the Missouri Basin and those big projects in the Upper Missouri Basin and try to figure out a cost-benefit ratio based upon the analysis

of an individual structure in a chain like that. I do not think that anybody can get any intelligent figures on that.

In other words, you could not say that after you get through this would be the benefit of this project if you did not build any of the others.

It is planned to have the power developed along the line all tied together, so it is practically one project in many of those multiple-purpose uses. I do not think that it is proper to try to just figure out a cost ratio for one of those when you are bound to consider them all as a unit.

Mr. Donnelly, I am very honest. I do not see how you are going to ever overcome some of the deficiencies which you have been pointing out here. I just do not know how to do it.

For instance, we come in here and we tell the committee it is going to cost so much to build an air base out here.

Mr. KERR. The only way to overcome a deficiency is to just stop the project and let it die; is that it?

General PICK. That is right.

Mr. KERR. That is the only way to get away from it.

General PICK. I go out, and we make an estimate. We make the best estimate we can. It costs more. Now, then, that is absolutely true of civil practice. The railroads, the manufacturers, the insurance companies all find that when they build a big project it costs more than their initial estimates.

Mr. DONNELLY. General, we will have to suspend for a few minutes.

(Thereupon a short recess was taken.)

Mr. DONNELLY. May we resume, Mr. Chairman?

Mr. KERR. Yes; go ahead.

COST INCREASE OF 124 PERCENT IN CIVIL WORKS CONSTRUCTION PROGRAM

Mr. DONNELLY. These are the figures, gentlemen, that show the story for the whole construction program, if I may give them to you; and this is the basis for all the money that has been appropriated for the last few years.

(The table entitled "Analysis by the Corps of Engineers of cost estimates for 182 Civil Works projects comprising fiscal year 1951 program," is as follows:)

ANALYSIS BY THE CORPS OF ENGINEERS OF COST ESTIMATES FOR 182 CIVIL WORKS PROJECTS COMPRISING FISCAL YEAR 1951 PROGRAM

[Money in thousands of dollars]

	River and harbor projects				Flood-control projects				Totals			Actual figures, total	Percentages of cost increases, using authorization estimate as base
	Construction	Relocation	Land	Total	Construction	Relocation	Land	Total	Construction	Relocation	Land		
PROJECT ESTIMATES													
I. Basis for authorization	$1,334,380	$48,986	$42,389	$1,425,755	$999,707	$129,532	$83,523	$1,212,762	$2,334,087	$178,518	$125,912	$2,638,517,000	
II. Support of first construction appropriation	1,893,626	82,240	65,280	2,041,146	1,334,568	184,819	115,571	1,634,958	3,228,194	267,059	180,851	3,676,104,000	39.3
III. Support of fiscal year 1950 appropriation	2,537,812	105,406	82,462	2,725,680	2,285,289	340,889	191,989	2,818,167	4,823,101	446,295	274,451	5,543,847,000	110.1
IV. Support of fiscal year 1951 appropriation	2,564,994	114,906	84,942	2,764,842	2,374,963	366,199	205,316	2,946,478	4,939,957	481,105	290,258	5,711,320,000	116.5
V. Support of fiscal year 1952 appropriation	2,667,680	109,695	67,660	2,845,035	2,469,377	384,873	213,166	3,067,416	5,137,057	494,568	280,826	5,912,451,000	124.0
EXPLANATION OF DIFFERENCE BETWEEN COST ESTIMATES													
(I–II) Between authorized estimate and first construction estimate:													
11. Price changes	499,360	27,573	21,474	548,407	151,312	23,237	22,512	197,061	650,672	50,810	43,986	745,468,000	28.3
12. Authorized project extensions	49,269	5,141	785	55,195	72,856	8,902	1,310	83,068	122,125	14,043	2,095	138,263,000	5.2
13. Changed local needs or situations	11,839	------	------	11,839	18,796	4,599	1,530	24,925	30,635	4,599	1,530	36,764,000	1.4
14. Structural and engineering modifications	1,786	------	632	2,418	33,661	4,829	−515	37,975	35,447	4,829	117	40,393,000	1.5
15. Unforeseen conditions	3,777	------	------	3,777	30,195	6,173	4,752	41,120	33,972	6,173	4,752	44,897,000	1.7
16. Inadequacy (or excess) in former estimate	−6,785	540	------	−6,245	28,041	7,547	2,459	38,047	21,256	8,087	2,459	31,802,000	1.2
Total	559,246	33,254	22,891	615,391	334,861	55,287	32,048	422,196	894,107	88,541	54,939	1,037,587,000	39.3
(II–III) Between first construction estimate and estimate for fiscal year 1950:													
21. Price changes	293,456	15,841	4,142	313,439	533,117	82,392	35,555	651,064	826,573	98,233	39,697	964,503,000	36.6
22. Authorized project extensions	136,395	------	3,463	139,858	231,215	26,707	14,689	272,611	367,610	26,707	18,152	412,469,000	15.6
23. Changed local needs or situations	40,203	790	18	41,011	25,910	7,150	1,994	35,054	66,113	7,940	2,012	76,065,000	2.4
24. Structural and engineering modifications.	44,139	844	689	45,672	46,375	11,414	2,656	60,445	90,514	12,258	3,345	106,117,000	4.0
25. Unforeseen conditions	66,859	2,578	3,988	73,425	71,651	16,123	16,258	104,032	138,510	18,701	20,246	177,457,000	6.7
26. Inadequacy (or excess) in former estimate.	63,134	3,113	4,882	71,129	42,453	12,284	5,266	60,003	105,587	15,397	10,148	131,132,000	5.0
Total	644,186	23,166	17,182	684,534	950,721	156,070	76,418	1,183,209	1,594,907	179,236	93,600	1,867,743,000	70.8

(III–IV) Between estimate for fiscal year 1950 and fiscal year 1951:														
31. Price changes	10,492	88	97	10,677	41,877	10,779	11,671	64,327	52,369	10,867	11,768	75,004,000		44.8
32. Authorized project extensions	36			36	25,227	497		25,724	25,263	497		25,760,000		15.4
33. Changed local needs or situations	2,750	716	955	4,421	2,939	5,407	385	8,731	5,689	6,123	1,340	13,152,000		7.8
34. Structural and engineering modifications	8,991	−164	744	9,571	10,633	−1,388	−106	9,139	19,624	−1,552	638	18,710,000		11.2
35. Unforeseen conditions	1,624		24	1,648	7,614	5,320	1,390	14,324	9,238	5,320	1,414	15,972,000		9.6
36. Inadequacy (or excess) in former estimate	3,289	8,860	660	12,809	1,384	4,695	−13	6,066	4,673	13,555	647	18,875,000		11.2
Total	27,182	9,500	2,480	39,162	89,674	25,310	13,327	128,311	116,856	34,810	15,807	167,473,000	6.4	100.0
(I–IV) Summary of difference authorized estimate and fiscal year 1951 estimate:														
41. Price changes	803,309	43,502	25,713	872,524	725,520	116,408	64,878	906,806	1,528,829	159,910	90,591	1,779,330,000	67.9	
42. Authorized project extensions	186,000	5,141	4,248	195,389	329,274	36,106	20,860	386,240	515,274	41,247	25,108	581,629,000	22.0	
43. Changed local needs or situations	54,491	1,506	973	56,970	48,454	17,158	3,909	69,521	102,945	18,664	4,882	126,491,000	4.4	
44. Structural and engineering modifications	54,659	680	2,065	57,404	90,670	14,855	2,035	107,560	145,329	15,535	4,100	164,964,000	6.3	
45. Unforeseen conditions	72,461	2,578	4,012	79,051	109,459	27,616	22,400	159,475	181,920	30,194	26,412	238,526,000	9.0	
46. Inadequacy (or excess) in former estimate	59,694	12,513	5,542	77,749	71,879	24,526	7,711	104,116	131,573	37,039	13,253	181,865,000	6.9	
Total	1,230,614	65,920	42,553	1,339,087	1,375,256	236,669	121,793	1,733,718	2,605,870	302,589	164,346	3,072,805,000	116.5	
(IV–V) Between estimate used for fiscal year 1951 appropriation and fiscal year 1952 appropriation:														
51. Price changes	34,620	2,234	1,120	37,974	55,617	8,760	6,230	70,607	90,237	10,994	7,350	108,581,000		54.5
52. Authorized project extensions	−18,761	−19,000	−20,820	−58,581	51,955	1,432	379	53,766	33,194	−17,568	−20,441	−4,815,000		−2.4
53. Changed local needs or situations	5,954			5,954	−401	1,506	965	2,070	5,553	1,506	965	8,024,000		4.0
54. Structural and engineering modifications	43,202	11,555		54,757	−14,258	2,213	−1,482	−13,527	28,944	13,768	−1,482	41,230,000		20.5
55. Unforeseen conditions	28,451		83	28,534	8,410	3,734	320	12,464	36,861	3,734	403	40,998,000		20.4
56. Inadequacy (or excess) in former estimate	9,217		2,335	11,552	−6,909	1,029	1,438	−4,442	2,308	1,029	3,773	7,110,000		3.0
Total	102,683	−5,211	−17,282	80,190	94,414	18,674	7,850	120,938	197,097	13,463	−9,432	201,128,000	7.5	100.0
													124.0	
RECAPITULATION														
(I–V) Summary of difference authorized estimate and fiscal year 1952 appropriation:														
61. Price changes	837,929	45,736	26,833	910,498	781,137	125,168	71,108	977,413	1,619,066	170,904	97,941	1,887,911,000	71.6	
62. Authorized project extensions	167,239	−13,859	−16,572	136,808	381,229	37,538	21,230	440,006	548,468	23,679	4,667	576,814,000	21.8	
63. Changed local needs or situations	60,445	1,506	973	62,924	48,053	18,664	4,874	71,591	108,498	20,170	5,847	134,515,000	5.1	
64. Structural and engineering modifications	97,861	12,235	2,065	112,161	76,422	17,068	553	94,033	174,273	29,303	2,618	206,194,000	7.8	
65. Unforeseen conditions	100,912	2,578	4,095	107,385	117,869	31,350	22,720	171,939	218,781	33,928	26,815	279,524,000	10.6	
66. Inadequacy	68,911	12,513	7,877	89,301	64,970	25,555	9,149	99,674	133,881	38,068	17,026	188,975,000	7.1	
Total of cost increases	1,333,297	60,709	25,271	1,419,277	1,469,670	255,343	129,643	1,854,656	2,802,967	316,052	154,914	3,273,933,000	124.0	

If you will look at the right-hand column over here you will find the percentage year-by-year; first, the difference between the authorization estimate (based on survey reports) and the estimate in support of the first construction appropriation, an increase of 39.3 percent.

Then from that point, to fiscal year 1950 the cost went up to 110.1 percent; and then from fiscal year 1950 to fiscal year 1951 it went up to 116.5 percent. As of this year, with the civil-functions bill now pending, the increase has been 124 percent over the authorization estimate, and the authorization estimate was weighted——

Mr. KERR. This covers all projects?

Mr. DONNELLY. Yes, sir. The authorization estimate was weighted as of 1937.

Now, if you will notice the table at the top on the right-hand side, alongside that 124 percent, you get the present cost of the projects, which is $5,912,451,000. That is quite an increase over the authorization estimate, which was $2,638,517,000.

Now, the cost for these projects today, that this committee just voted on——

Mr. KERR. How long has this project been under way?

Mr. DONNELLY. This is the whole 182, Judge. The survey reports showed $2,638,517,000. Then it has increased 124 percent to the cost this year for the whole 182 projects of $5,912,451,000.

We have an analysis of the reasons for all this increase. It is shown on this sheet. You see, I think, that there are areas where improvement in planning can be made so that this committee will have the benefit of better information, upon which to vote.

Mr. KERR. A large percent of that increase, though, is due to the increase of the cost of material and cost of labor; is that not right?

Mr. DONNELLY. Exactly. It is right down here at the bottom. We have it broken down.

Gentlemen, if you will look at the bottom on the righthand side you will see that the increase in cost for the projects due to price-level changes is 71.6 percent, which is a large increase.

Then you have the next item, authorized project extensions, a 21.8 percent increase.

Now, with respect to those two categories we need not have any further concern. The rise in prices follows generally the Engineering News Record Index, which is published monthly by the engineering profession. That gives a key as to the rise in construction costs.

The authorized project extensions are those either specifically authorized for an individual project or those which are the result of general authorizations, such as the act of Congress requiring that power consideration be given.

But the big things to consider are the next four percentages in the lower right-hand corner over here, which add up to $800 million and which represent money that could be saved, perhaps, if better planning were had.

Mr. Chairman, you will see here that this is the increase for the whole 182 projects. It is a 124 percent increase, from $2.6 billion to $5.9 billion. The increase in dollars is $3,273,000,000.

We have broken this down into price changes, 71.6 percent; and authorized project extensions, 21.8 percent. I do not think we should concern ourselves further with those. The first is the price change as a result of economics, and the second is due to acts of Congress.

Then you have the categories of changed local needs or situations, structural and engineering modifications, unforeseen conditions, and inadequacy. Those four total $800 million of the increase, or 30.6 percent of the tremendous increase in the cost of these projects.

(Discussion off the record.)

Mr. DONNELLY. The increased cost of individual projects has a direct and important bearing on their economic justification as stated in the benefit-cost ratios. This is particularly true since the benefit-cost ratio on many projects is just a shade above the minimum prescribed by statute. In 110 projects which the corps reported to this committee in the April 1951 hearings, the ratio on 87 projects was between 1.0 to 1 and 1.9 to 1. A table listing this data (which appeared on pp. 778–80 of the April hearings) is as follows:

HEARINGS IN APRIL AND MAY 1951 BEFORE SUBCOMMITTEE ON ARMY CIVIL FUNCTIONS OF HOUSE APPROPRIATIONS COMMITTEE

BENEFIT-TO-COST RATIO OF PROJECTS

RIVERS AND HARBORS

Construction, fiscal year 1952

Project	Total estimated cost	Benefit-to-cost ratio
Alabama:		
Apalachicola, Chattahoochee, and Flint Rivers:		
Jim Woodruff lock and dam, Florida	$42,208,000	1.13
Buford Dam, Ga	40,225,000	1.13
Demopolis lock and dam	20,843,000	1.07
Alaska: Wrangell Narrows	4,300,000	1.21
California: San Diego River and Mission Bay	10,300,000	2.40
Florida:		
Canaveral Harbor	3,276,000	1.30
Jacksonville to Miami waterway	24,131,000	[1].69
Jacksonville Harbor	12,044,400	2.00
Georgia: Savannah Harbor	9,057,700	1.27
Illinois:		
Illinois waterway (exclusive of Calumet-Sag Channel)	29,164,800	4.06
Mississippi River between Ohio and Missouri Rivers: Chain of Rocks canal	39,825,000	([2])
Mississippi River between Missouri River and Minneapolis, Minn. (exclusive of St. Anthony Falls, Minn., and Keokuk lock, Iowa)	173,108,300	1.22
Ohio River open channel work	21,546,300	1.50
Iowa: Missouri River from Kansas City, Mo., to Sioux City, Iowa	172,112,900	1.87
Louisiana:		
Calcasieu River and Pass	12,645,000	8.06
Gulf Intracoastal Waterway: Algiers cut-off	31,075,000	([2])
Pearl River, La. and Miss	8,274,700	1.07
Maryland: Baltimore Harbor and channels	10,400,000	2.32
Massachusetts: Fall River Harbor	2,929,800	2.00
Michigan: St. Marys River (power plant)	10,750,000	1.17
Minnesota: St. Anthony Falls extension	20,477,700	([2])
Mississippi: Harrison County shore protection	1,133,000	2.05
Missouri: Missouri River, Kansas City, Mo., to mouth	113,297,100	1.87
Montana: Missouri River at Fort Peck	156,900,000	1.34
New Jersey:		
Newark Bay, Hackensack and Passaic Rivers	9,822,000	1.60
New York and New Jersey Channels	53,141,000	1.50
New York:		
Buffalo Harbor	16,146,000	1.20
Hudson River Channel	7,074,000	([2])
New York Harbor, entrance channels and anchorage areas	17,900,000	([2])
Ohio: Cleveland Harbor	23,904,000	1.14
Oregon:		
McNary Dam, Oreg. and Wash	270,000,000	1.12
The Dalles Dam, Oreg. and Wash	326,366,000	1.29
Pennsylvania:		
Monongahela River, Pa. and W. Va	65,140,000	3.30
Schuylkill River (culm removal)	12,574,000	1.63
Tennessee:		
Cumberland River, Ky. and Tenn.:		
Cheatham lock and dam, Tennessee	14,000,000	3.04
Old Hickory lock and dam, Tennessee	49,120,000	1.70
Texas:		
Houston ship channel	17,403,800	1.70
Gulf waterway (Colorado River locks)	29,222,500	1.50
Sabine-Neches waterway	15,320,500	4.90
Washington:		
Chief Joseph Dam	206,000,000	1.56
Ice Harbor lock and dam	95,899,000	1.30

[1] Benefit-cost ratio shown is for peacetime conditions in reach between St. Johns River and Cape Canaveral (Cocoa, Fla.). The project was authorized primarily to afford a protected inland waterway during wartime. The benefit-cost ratio shown would be multiplied many times in event that a protected route is again needed for water shipments on Atlantic seaboard.

[2] Not evaluated.

Construction, fiscal year 1952

Project	Total estimated cost	Benefit-to-cost ratio
Arkansas:		
Blakely Mountain Reservoir	$32,675,000	1.19
Bull Shoals Reservoir, Ark. and Mo	76,300,000	1.71
Narrows Reservoir	13,085,000	[1] 1.0
California:		
Cherry Valley Reservoir	8,000,000	1.1
Farmington Reservoir	3,729,000	1.2
Folsom Reservoir	50,792,000	1.2
Isabella Reservoir	19,050,000	1.9
Los Angeles County drainage area (exclusive of Whittier Narrows Reservoir)	301,605,600	2.05
Merced County stream group	2,700,000	1.4
Pine Flat Reservoir	51,121,000	2.0
San Antonio Reservoir	7,000,000	1.31
Whittier Narrows Reservoir	36,320,000	1.19
Connecticut: Mansfield Hollow Reservoir	7,550,000	1.1
Florida: Central and Southern Florida	58,129,000	2.23
Georgia: Clark Hill Reservoir, Ga. and S. C	78,400,000	1.88
Idaho:		
Albeni Falls Reservoir	31,070,000	2.65
Lucky Peak Reservoir	22,000,000	1.1
Illinois:		
East St. Louis and vicinity	12,092,000	9.78
Farm Creek reservoirs	10,384,500	2.68
Indiana: New Albany	6,200,000	1.2
Kansas:		
Kansas Citys, Mo. and Kans	41,389,000	2.74
Missouri River agricultural levees, Kansas, Missouri, Iowa, and Nebraska	124,837,000	[3] 1.6
Kentucky:		
Ashland	4,725,000	1.01
Covington	8,400,000	1.1
Dale Hollow Reservoir, Tenn. and Ky. (*See* Tennessee.)		
Hawesville	979,900	1.0
Louisville	25,700,000	2.2
Maysville	5,839,000	1.21
Wolf Creek Reservoir	82,700,000	2.02
Louisiana: Mermenatu River	5,000,000	1.33
Maryland: Cumberland, Md., and Ridgeley, W. Va	12,900,000	1.0
Massachusetts: Adams	4,600,000	1.16
Minnesota: Red River of the North, S. Dak., N. Dak., and Minn	11,548,400	1.37
Nebraska:		
Gavins Point Reservoir, S. Dak. and Nebr	44,900,000	1.1
Harlan Conty Reservoir	49,897,000	1.05
New Mexico: James Canyon Reservoir	7,201,000	[1] 1.22
New York:		
Hoosick Falls	1,100,000	1.26
Mount Morris Reservoir	25,250,000	1.23
Olean	3,570,000	3.50
North Carolina: Buggs Island Reservoir, Va. and N. C	$88,840,000	1.34
North Dakota:		
Garrison Reservoir	268,000,000	1.2
Oahe Reservoir, S. Dak. and N. Dak. (*See* South Dakota.)		
Red River of the North, S. Dak., N. Dak. and Minn. (*See* Minnesota.)		
Ohio: Muskingum River reservoirs	41,438,300	1.9
Oklahoma:		
Denison Reservoir, Tex. and Okla	61,630,000	1.22
Fort Gibson Reservoir	45,000,000	[2] 1.15
Tenkiller Ferry Reservoir	21,750,000	1.09
Oregon:		
Detroit Reservoir	69,797,000	1.01
Lookout Point Reservoir	88,230,000	1.16
Willamette River Basin (bank protection)	9,991,000	1.4
Pennsylvania:		
Conemaugh River Reservoir	47,500,000	2.4
East Branch Clarion River Reservoir	9,612,000	1.27
Williamsport	15,000,000	2.5
South Carolina: Clark Hill Reservoir, Ga. and S. C. (*See* Georgia.)		
South Dakota:		
Fall River Basin	4,479,000	1.45
Fort Randall Reservoir	189,200,000	1.5
Gavins Point Reservoir, S. Dak. and Nebr. (*See* Nebraska.)		
Oahe Reservoir, S. Dak. and N. Dak	245,900,000	1.4
Red River of the North, S. Dak., N. Dak., and Minn. (*See* Minnesota.)		
Tennessee:		
Center Hill Reservoir	45,700,000	1.89
Dale Hollow Reservoir, Tenn. and Ky	26,000,000	1.55
Memphis, Wolf River and Nonconnah Creek	13,430,000	1.1
Texas:		
Belton Reservoir	17,750,000	1.64
Benbrook Reservoir	12,000,000	[3] 1.56
Denison Reservoir, Tex. and Okla. (*See* Oklahoma.)		
Fort Worth floodway	4,008,400	[3] 1.56
Garza-Little Elm Reservoir	23,321,900	1.64
Lavon Reservoir	12,000,000	1.34
San Angelo Reservoir and Floodway	16,200,000	1.28
Texarkana Reservoir	33,000,000	1.12
Whitney Reservoir	42,043,900	1.15
Virginia:		
Buggs Island Reservoir, Va. and N. C. (*See* North Carolina.)		
Philpott Reservoir	13,120,000	1.07

[1] For basin plan. Annual cost and benefits not computed for separate units at this time.
[2] For 3-reservoir plan.
[3] For basin plan for flood control.

BENEFIT-TO-COST RATIO OF PLANNING PROJECTS

RIVERS AND HARBORS

Planning, fiscal year 1952

Project	Total estimated cost	Benefit-to-cost ratio
Alabama:		
Alabama-Coosa Rivers, Ala. and Ga.: Howell Mill Shoals Dam, Ala.	$91,600,000	1.16
Tennessee-Tombigbee waterway, Alabama and Mississippi	179,264,000	1.06
Arkansas: Arkansas River and tributaries, Arkansas and Oklahoma	686,370,000	1.07
Kentucky:		
Ohio River locks and dams:		
Fernbank lock and dam	52,540,000	1.30
Greenup lock and dam	46,550,000	1.30
Cumberland River, Ky. and Tenn.: Lower Cumberland locks and dam	130,000,000	1.70
Ohio: Ohio River locks and dam: New Cumberland lock and dam	39,352,500	1.20
Tennessee: Cumberland River, Ky. and Tenn.: Carthage Dam	37,240,000	1.60
Texas: Neches-Angelina Rivers: McGee Bend Dam	39,720,000	1.36

COST INCREASE DUE TO OMISSIONS IN ENGINEERING PLANNING

Mr. DONNELLY. Now, members of the committee, so that you will have the detail for this increase that I spoke of for those four categories totaling $800 million, let us talk first about inadequacy. Inadequacy is the category of omission in the engineering planning.

You will find of the 182 projects in the current program that on 48 of the projects the corps had omissions of engineering estimates in excess of 10 percent. The omissions start as high as 217 percent errors in engineering planning, and they run down through the 48 projects to 10.6. The total increase due to this omission in engineering planning is $175,914,140. This is shown by the following table:

Inadequacies to indicate extent of increase over 10 percent for 1951 program (48 of 182 projects)[1]

Name of project	Authorization date	Authorization estimate	Amount of increase between authorization estimate and 1952 fiscal year estimate due to inadequacies	Percent of increase over authorization estimate
1. Missouri River—Sioux City	1927 and 1945	$20,000,000	$43,475,000	217.3
2. Lavon Reservoir	1945	3,733,000	4,082,800	109.3
3. Farm Creek Reservoir	1944	3,017,900	3,379,800	108.6
4. Jim Woodfuff Reservoir	1945 and 1946	2,799,000	2,800,000	100.0
5. Dorena Reservoir	1938	3,490,000	3,426,000	98.1
6. Columbia River tributary	1935 and 1945	400,000	390,000	97.5
7. Fort Worth floodway	1945	399,300	355,400	88.9
8. Degonia-Fountain Bluff	1936	330,000	277,750	83.9
9. East St. Louis and vicinity	1936	1,158,000	905,000	78.1
10. Fall River Basin	1941	1,050,000	772,400	73.5
11. Detroit Reservoir	1938	14,676,000	10,170,000	69.3
12. Williamsport flood project	1936 and 1948	1,880,000	1,269,900	67.4
13. Baldhill Reservoir	1944 to 1946	810,000	457,320	56.4
14. Buford Reservoir	1946	17,631,000	9,820,000	55.7
15. Miller Pond district	1938	28,000	15,000	53.5
16. Isabella Reservoir	1944	6,800,000	3,560,000	52.3
17. Sacramento River, ship channel	1946	12,742,000	6,565,000	51.5
18. Pine Flat Reservoir	1944	19,700,000	9,329,000	47.3
19. St. Marys River	1945	3,500,000	1,700,000	45.7
20. Garza-Little Elm	1945	5,471,987	2,258,327	41.2
21. Wood River district	1938	750,000	300,000	40.0
22. Red Lake and Clearwater Rivers	1944	902,940	350,068	38.7
23. McNary lock-dam	1945	49,470,000	18,373,000	37.1
24. Massillon project	1938	2,988,000	946,300	35.0
25. Reconstruction of locks 2	1909	4,509,000	1,371,700	30.4
26. Newport project	1937	1,411,000	426,000	30.1
27. Hulah Reservoir	1936	2,343,000	654,000	27.9
28. St. Thomas Harbor	1937	743,000	192,825	25.9
29. Blakely Mountain Dam	1944	11,080,000	2,814,000	25.4
30. Oahe Reservoir	1944	72,800,000	17,760,000	24.5
31. Mill Creek Reservoir	1946	1,527,000	360,000	23.5
32. Hornell project	1938	1,418,700	308,600	21.7
33. Wichita-Valley Center project	1936	2,603,100	551,000	21.1
34. Mud Mountain Dam	1936	3,206,000	671,000	20.9
35. York flood project	1936 and 1938	2,000,000	412,200	20.6
36. Couteau-Nameoke Venice levee	1936	132,000	25,000	18.1
37. Coralville Reservoir	1938	4,999,000	946,000	18.1
38. Dewey Reservoir	1938	3,940,000	727,200	18.1
39. Garrison Reservoir	1944	105,000,000	17,894,000	17.0
40. Umpqua River project	1941	175,000	30,000	17.0
41. Buffalo Harbor	1912	7,478,800	1,257,900	16.8
42. Crescent City Harbor	1918 and 1945	2,607,000	412,000	15.8
43. Folsom Reservoir	1944	18,474,000	2,581,000	13.9
44. Farmington Reservoir	1944	1,616,200	205,000	12.6
45. Perry County districts 1, 2, and 3	1936	859,000	100,000	11.6
46. Lorain Harbor	1899	2,457,350	283,650	11.5
47. Demopolis Reservoir	1945	6,750,000	750,000	11.1
48. Sunbury flood project	1936 and 1941	1,900,000	203,000	10.6
Total		433,756,277	175,914,140	

[1] The Corps of Engineers has explained the cost increases included in this category as follows:
"Under this heading will be placed any items of cost increase which were plainly due to inadequacy in the first estimate. These are items which were omitted, but should have been included by the estimator, as distinguished from those which could not have been foreseen. Also in this category will be placed differences due to estimates made under emergency conditions during the depression period or during the war."

Cost Increase Due to Unforeseen Conditions

Mr. Donnelly. Now, may I take the next category, "Unforeseen conditions." In this next table entitled "Unforeseen conditions to indicate extent of increase over 10 percent for 1951 program" we find that in 70 of the 182 projects there were increases due to unforeseen conditions totaling $246,942,000. It is significant to note that the unforeseen conditions run from 502 percent down to 11.1 percent.

Mr. Korth. What is the average percentage there? Do you have that?

Mr. DONNELLY. I did not average them out.

Mr. KORTH. I thought you had. I am sorry.

General PICK. About $250 million-odd was based on a total sum of what?

Mr. KORTH. $704 million.

Mr. DONNELLY. If we take the authorization estimate for the 70 projects in this category——

General PICK. Is that on the $5,900,000,000?

Mr. DONNELLY. General, if you take out of the 182 projects the 70 projects where there are unforeseen conditions in excess of 10 percent you get these figures.

(The table above referred to is as follows:)

Unforeseen conditions to indicate extent of increase over 10 percent for 1951 program (70 of 182 projects) [1]

Name of project	Authorization date	Authorization estimate	Amount of increase between authorization estimate and 1952 fiscal year estimate due to unforeseen conditions	Percent of increase over authorization estimate
1. Wood River district	1938	$750,000	$3,767,000	502.2
2. Grand Tower district	1938	320,000	1,244,000	388.7
3. Degognia-Ftn. bluff	1936	330,000	1,105,700	334.8
4. Fort Worth floodway	1945	399,300	1,095,455	274.4
5. Perry County 1-2-3	1936	859,000	2,179,000	253.5
6. Mud Mountain Dam	1936	3,206,000	7,545,000	235.3
7. East St. Louis and vicinity	1936	1,158,000	2,560,500	221.2
8. Missouri River, Kansas City to mouth	1912	20,000,000	38,266,000	191.6
9. Newport project	1937	1,411,000	2,400,000	170.1
10. Garza-Little Elm	1945	5,471,987	7,538,451	137.7
11. Miller Pond	1938	28,000	37,000	135.7
12. Columbia levee district	1936	546,000	670,000	122.6
13. St. Thomas Harbor	1937	743,000	776,775	104.4
14. Columbia River tributary	1935 and 1945	400,000	373,400	93.2
15. Missouri River, Sioux City	1927 and 1945	20,000,000	18,603,070	93.0
16. Dillon Reservoir	1938	6,847,800	6,007,060	87.7
17. Red Lake and Clearwater	1944	902,940	773,568	85.7
18. Hutchenson, Ark	1936	1,050,000	879,100	83.7
19. Mount Morris Reservoir	1944	5,360,000	4,033,100	75.3
20. Dorena Reservoir	1938	3,490,000	2,724,000	78.0
21. Jim Woodruff	1945 and 1946	2,799,000	1,994,000	71.2
22. Hulah Reservoir	1936	2,343,000	1,639,800	69.9
23. Fern Ridge Reservoir	1938	2,538,000	1,673,000	65.9
24. East Cape Girardeau	1936	395,000	260,300	65.8
25. Mill Creek Reservoir	1946	1,527,000	1,000,000	65.4
26. Oologah Reservoir	1936 and 1946	8,345,000	4,600,000	55.1
27. Detroit Reservoir	1938	14,676,000	7,075,000	48.8
28. Cresent City Harbor	1918 and 1945	2,607,000	1,254,500	48.1
29. Pine Flat Reservoir	1944	19,700,000	9,382,000	47.6
30. Cherry Valley Reservoir	1944	3,827,000	1,718,000	44.9
31. Baldhill Reservoir	1944 and 1946	810,000	353,770	42.3
32. Washington Channel	1935	1,261,000	547,900	42.6
33. Kansas Citys	1936 and 1944	10,000,000	4,186,870	41.8
34. York flood project	1936 and 1938	2,000,000	807,900	40.3
35. Bayou Teche—Vermillion	1941	1,390,000	555,000	39.9
36. Fort Gibson	1941, 1944, and 1946	13,700,000	5,465,000	39.8
37. Hoosick Falls	1936 and 1941	137,000	52,000	37.9
38. Galena project	1944	418,000	155,230	37.0
39. Farmington Reservoir	1944	1,616,200	567,000	34.4
40. Wister Reservoir	1938	6,560,000	2,174,700	33.1
41. Heyburn Reservoir	1946	1,838,500	608,700	33.0
42. Mississippi River between Ohio and Missouri Rivers chain of rocks canal.	1945	10,290,000	3,370,000	32.7
43. Mississippi River between Ohio and Missouri.	1930	28,500,000	8,125,000	28.5
44. Isabella Reservoir	1944	6,800,000	1,913,000	28.1
45. Oahe Reservoir	1944	72,800,000	18,759,000	25.7
46. Umpqua River	1941	175,700	45,630	25.6
47. Cagles Mill	1938	1,478,000	350,000	23.6
48. York Spit channel	1945 and prior	644,500	145,000	22.3
49. Williamsport flood project	1936 and 1948	1,880,000	406,000	21.6
50. Georgetown Harbor	1945	2,118,000	450,000	21.2

See footnote at end of table, p. 24.

Unforeseen conditions to indicate extent of increase over 10 percent for 1951 program (70 of 182 projects) [1]—Continued

Name of project	Authorization date	Authorization estimate	Amount of increase between authorization estimate and 1952 fiscal year estimate due to unforeseen conditions	Percent of increase over authorization estimate
51. Conemaugh Reservoir	1936 and 1938	$21,366,000	$4,406,900	$20.5
52. Fall River Basin	1941	1,050,000	211,000	20.0
53. St. Mary's River	1945	3,500,000	700,000	20.0
54. Kee levee, Arkansas River	1936	32,500	6,400	19.6
55. Blakely Mountain Dam	1944	11,080,000	2,087,000	18.8
56. Fort Peck Dam	1933, 1935, 1944	84,155,000	15,126,000	17.9
57. Fort Randall	1944	75,000,000	13,114,500	17.4
58. North Adams	1936 and 1941	1,471,000	256,000	17.4
59. Hornell project	1938	1,418,700	237,500	16.7
60. Denison Reservoir	1938	54,000,000	8,391,700	15.5
61. Lookout Point	1938	24,026,000	3,617,000	15.0
62. San Diego River	1946	6,228,000	922,000	14.8
63. Reconstruction of locks 2	1909	4,509,000	661,700	14.6
64. Mansfield Hollow	1941	3,090,000	450,800	14.5
65. New York Harbor	1884 and 1937	15,592,000	2,140,750	13.7
66. Texarkana	1946	20,300,000	2,700,000	13.3
67. Folsom Reservoir	1944	18,474,000	2,373,000	12.7
68. Bonneville Dam	1933 and 1937	40,200,000	4,823,000	11.9
69. Lawrenceburg	1938	2,291,000	260,000	11.7
70. Harlan County Reservoir	1938 and 1944	20,078,098	2,236,200	11.1
Total		704,308,225	246,942,939	

[1] The Corps of Engineers explained the cost increases included in this category as follows:

"Under this heading will be included changes in estimated costs due to factors which could not reasonably have been anticipated by capable engineers in preparing the first estimate on the basis of normal survey and investigational procedure, for example:

"(1) It is not practicable or economical to have complete foundation investigations for survey-report estimates. These cannot be provided fully until the construction stage is reached. Consequently it is unavoidable that unexpected and difficult foundation or subsurface conditions will be encountered in some cases.

"(2) Reservoirs are laid out on the best maps available, checked to the extent possible by current surveys. Detailed surveys made in carrying out the project may show that the reservoir area will be larger, that certain mineral rights may exist, or that additional road relocation will be necessary."

Cost Increase Due to Engineering Modifications

Mr. Donnelly. Now we have another item, this item of engineering modifications. We find that there are engineering modifications in excess of 10 percent on 63 out of the 182 projects. It is significant to note that the increases caused by structural and engineering modifications go as high as 726.9 percent, and going down through the 63 projects, to 10.6 percent; and the cost there is a quarter of a billion dollars, $226,638,000.

(The document above referred to is as follows:)

Structural and engineering modifications to indicate extent of increases over 10 percent for 1951 program (63 of 182 projects are listed)

Name of project	Authorization estimate	Amount of increase between authorization estimate and fiscal year 1952 estimate due to structural and engineering modifications	Percent of increase over authorization estimate
1. Adams project	$271,000	$1,970,000	726.9
2. Wood River district	750,000	3,138,000	418.7
3. East St. Louis and vicinity	1,158,000	3,973,000	343.1
4. Great Salt Plains Reservoir	972,000	3,188,000	327.9
5. North Adams project	1,471,000	4,754,900	323.2
6. Hoosick Falls project	137,000	428,000	312.4
7. Grand Tower district	320,000	932,000	291.3
8. Wichita-Valley Center project	2,603,100	6,513,000	234.6
9. Hords Creek Reservoir	460,000	1,048,200	228.3
10. Hulah Reservoir, Caney River	2,343,000	4,741,400	202.3
11. Jim Woodruff Reservoir	2,799,000	5,193,000	185.7
12. Missouri River at Sioux City	20,000,000	37,109,830	185.5
13. Kaw River levee project, Arkansas River	32,500	33,000	163.1
14. Fort Worth floodway	399,300	650,157	162.8
15. Williamsport flood project	1,880,000	2,379,200	126.6
16. Cagles Mill Reservoir	1,478,000	1,742,000	117.9
17. Montour Falls project	478,000	529,600	110.8
18. Mississippi River between Ohio and Missouri Rivers	10,290,000	10,286,000	100.0
19. Mount Morris Reservoir	5,360,000	5,214,700	97.3
20. Demopolis Reservoir	6,750,000	6,233,000	90.8
21. Fall River Basin project	1,050,000	932,200	88.6
22. San Angelo Reservoir	6,800,000	5,915,000	87.1
23. Hutchinson project, Arkansas River	1,050,000	884,200	83.8
24. Coralville Reservoir	4,999,000	3,463,500	71.4
25. Missouri River, Kansas City to mouth	20,000,000	10,531,100	52.5
26. Perry County districts Nos. 1, 2, and 3	859,000	450,000	52.4
27. Hornell project	1,418,700	711,100	50.1
28. Benbrook Reservoir	5,205,502	2,507,108	48.1
29. Oklahoma City floodway	2,037,000	889,000	43.6
30. Crescent City Harbor	2,607,000	1,131,500	43.3
31. Baltimore Harbor	6,565,000	2,688,000	40.9
32. East Cape Girardeau, Clear Creek	395,000	160,000	40.5
33. Dorena Reservoir	3,490,000	1,409,000	40.4
34. Louisville project	4,500,000	1,750,000	38.8
35. Sunbury flood project	1,900,000	732,000	38.4
36. Fort Gibson Reservoir	13,700,000	5,033,300	36.7
37. McNary lock and dam	49,470,000	17,511,000	35.4
38. Galena project	418,000	147,700	35.3
39. Bull Shoals Reservoir	42,000,000	14,801,800	35.2
40. Buford Reservoir	17,631,000	5,753,000	32.9
41. Mud Mountain Dam	3,206,000	1,035,000	32.4
42. Covington project	2,188,000	700,000	32.1
43. Red Lake and Clearwater Rivers	902,940	284,090	31.6
44. Nimrod Reservoir	2,888,000	876,400	30.4
45. Massillon project	2,988,000	893,700	29.5
46. Blakely Mountain Dam	11,080,000	3,152,000	28.4
47. Maysville project	1,820,000	510,000	28.3
48. Conemaugh Reservoir	21,366,000	5,313,000	24.9
49. East Branch, Clarion Reservoir	5,525,900	1,355,000	24.6
50. Farmington Reservoir	1,616,200	384,000	23.5
51. Philpott Reservoir	5,240,000	1,105,000	21.2
52. Buggs Island Reservoir	30,900,000	6,260,000	20.3
53. Merced County project	1,300,000	244,000	18.8
54. Columbia River tributaries	400,000	75,000	18.8
55. Garza-Little Elm project	5,471,987	960,576	17.6
56. Lavon Reservoir	3,733,000	579,257	15.6
57. Lookout Point Reservoir	24,026,000	3,513,000	14.6
58. Dillon Reservoir	6,847,800	985,000	14.5
59. Fort Peck Dam	84,155,000	11,450,000	13.6
60. Cherry Valley Reservoir	3,827,000	514,000	13.4
61. San Diego River-Mission Bay	6,228,000	819,000	13.2
62. Grapevine Reservoir	3,973,200	480,691	12.1
63. Oahe Reservoir	72,800,000	7,692,000	10.6
Total	548,530,129	226,638,209	

Mr. KERR. What does this item cover?

Mr. DONNELLY. That is the increase due to conditions that the Corps did not see in the survey reports, at the time they wrote the survey reports.

COST INCREASE OF RELOCATIONS AND LANDS

Then we have another category of increase, which has cost large sums of money. There are 2 items, "Relocations" and "Lands" for the total of 182 projects.

On this schedule we find that on one project authorized in 1941, with the relocation program only 1 percent complete, the estimate in the survey report was 3,396 percent off. Then there are other percentages for the projects shown on this schedule.

(The document above referred to is as follows:)

Data on relocations and lands for 182 projects comprising fiscal year 1951 program

[Only those projects in fiscal year 1951 program, which involve relocations and land acquisitions are listed]

Projects	Relocations					Lands						
	Authorization estimate		Fiscal year 1952 estimate			Authorization estimate		Fiscal year 1952 estimate				
	Date of authorization	Estimate of relocation cost	Estimate of relocation cost	Percent increase over authorization estimate	Percent of completion of relocation program	Estimate of land cost	Number of acres	Estimate of land cost	Number of acres	Percentage of increase over authorization estimate		Percent of completion of land acquisition program
										Cost	Acreage	
FLOOD-CONTROL PROJECTS												
Tucson diversion channel	1948	$318,000	$318,000	0	0	0	0	0	0			
Blakely Mountain Dam	1944	195,000	715,000	267	1	$768,000	36,700	$3,800,000	88,952	395	142	7
Bulls Shoals Reservoir	1941	158,000	5,524,000	3,396	1	1,565,000	40,000	4,641,000	101,275	197	153	44
Narrows Reservoir	1941 and 1944	350,000	630,000	80	83	238,000	12,555	640,000	16,168	169	29	73
Nimrod Reservoir	1938	313,000	322,700	3	100	650,000	18,000	654,500	24,793	1	38	99
Norfork Reservoir	1938 and 1941	288,000	1,572,600	446	100	875,000	14,000	1,191,900	49,154	36	251	100
Cherry Valley Reservoir	1944	474,000	625,000	32	(1)	340,000	(1)	128,000	(1)	−62	(1)	(1)
Farmington Reservoir	1944	117,000	285,000	144	0	257,700	5,300	385,000	5,450	49	3	9
Folsom Reservoir	1944	511,000	4,580,000	796	1	645,000	7,460	2,385,000	19,700	270	166	16
Isabella Reservoir	1944	1,163,000	6,950,000	498	1	1,578,000	14,440	3,744,000	17,800	137	23	29
Los Angeles County drainage area	1936–38, 1941	[2] 0	18,600,600		(2)	0	0	7,175,000	1,200			90
Pine Flat Reservoir	1944	507,000	4,132,000	715	37	364,000	15,000	715,000	15,000	96	0	63
Whittier Narrows Basin	1941	500,000	8,775,000	1,655	2	7,500,000	3,103	14,645,000	2,700	95	−13	23
Mansfield Hollow Reservoir	1941	236,600	1,508,000	537	0	270,400	2,200	827,000	2,217	206	1	30
Clark Hill Reservoir	1944	1,809,000	5,400,000	198	50	1,354,500	86,500	5,498,000	169,295	306	96	68
Lucky Peak Reservoir	1946	1,891,000	6,907,000	265	0	236,000	3,483	415,000	7,557	76	117	10
Columbia levee district	1936	0	401,800		48	0	0	0	0			
Degognia-Fountain Bluff district	1936	0	465,000		1	0	0	0	0			
East St. Louis and vicinity	1936	0	2,070,500		0	0	0	0	0			
Farm Creek Reservoir	1944	1,200,000	2,662,770	122	87	216,800	934	425,110	1,184	96	27	91
Galena project	1944	31,000	18,000	−42	100	0	0	0	0			
Grand Tower district	1938	0	194,200		0	0	0	0	0			
Prairie du Rocher	1946	72,500	138,500	91	0	0	0	0	0			
Wood River district	1938	0	1,649,000		0	0	0	0	0			
Cagles Mill Reservoir	1938	77,000	857,000	1,013	0	378,000	3,000	750,000	7,300	98	143	63
Coralville Reservoir	1938	340,000	4,462,000	1,212	0	1,410,000	22,500	5,604,000	34,700	297	54	11

See footnotes at end of table, p. 30.

Data on relocations and lands for 182 projects comprising fiscal year 1951 program—Continued

Projects	Relocations					Lands						
	Authorization estimate		Fiscal year 1952 estimate			Authorization estimate		Fiscal year 1952 estimate				
	Date of authorization	Estimate of relocation cost	Estimate of relocation cost	Percent increase over authorization estimate	Percent of completion of relocation program	Estimate of land cost	Number of acres	Estimate of land cost	Number of acres	Percentage of increase over authorization estimate		Percent of completion of land acquisition program
										Cost	Acreage	
FLOOD-CONTROL PROJECTS—con.												
Fall River Reservoir	1941	$166,000	$249,030	50	100	$754,000	10,650	$1,765,210	15,160	134	42	100
Hutchinson project, Arkansas River	1936	492,000	2,974,000	504	0	0	0	0	0			
Kansas City	1936 and 1944	0	2,403,803		100	0	0	165,000	426			99
Wichita-Valley Center project	1936	1,133,800	4,528,000	299	0	0	0	0	0			
Dewey Reservoir	1938	940,000	815,300	−13	100	1,450,000	3,450	2,394,800	13,335	65	287	76
Wolf Creek Reservoir	1938	7,160,000	10,453,800	46	64	4,340,000	56,830	10,460,000	96,000	141	69	86
Bayou Teche-Vermillion River	1941	200,000	322,000	61	98	0	0	0	0			
Cumberland, Md.-Ridgeley	1936 and 1946	0	0			172,000	98	363,400	98	111	0	0
Knightville Reservoir	1938 and 1941	475,000	636,000	34	100	101,000	1,800	228,000	2,679	126	49	100
Red Run project, Clinton River	1948	325,000	345,000	6	0	0	0	0	0			
Red Lake and Clearwater Rivers	1944	28,680	325,230	1,034	3	0	0	0	0			
Red River of the North project	1948	180,700	19,700	−89	0	113,385	1,460	212,200	2,300	87	58	0
Perry County districts 1, 2, 3	1936	0	374,100		0	0	0	0	0			
Harlan County Reservoir	1938, 1941, and 1944.	3,213,860	11,940,304	272	56	1,137,500	35,000	4,779,000	33,100	320	−5	38
Jemez Canyon project	1948	0	0			6,200	3,500	13,440	6,700	117	91	0
Hornell project	1938	0	357,900		99	0	0	466,800	345			43
Montour Falls project	1941	88,000	436,700	396	100	0	0	0	0			
Mount Morris project	1944	0	181,000		40	271,000	3,300	446,500	4,268	65	29	25
Olean flood project	1946	52,900	5,800	−89	24	0	0	0	0			
Portville flood project	1946	43,800	0			0	0	0	0			
Buggs Island Reservoir	1944	6,500,000	12,550,000	93	7	4,350,000	88,000	8,960,000	115,000	106	31	64
Baldhill Reservoir	1944 and 1946	0	35,000		0	208,000	6,000	633,400	8,000	205	33	87
Garrison Reservoir	1944	10,600,000	26,960,000	154	3	6,100,000	480,000	16,840,000	480,000	176	0	64
Dillon Reservoir	1938	3,908,300	11,476,600	194	54	1,358,500	11,600	4,817,000	14,470	255	25	15
Massillon project	1938	1,392,000	3,892,100	180	63	390,000	160	496,200	284	27	77	93
Muskingum Reservoirs	1939	9,164,000	12,595,400	37	99	1,600,000	145,481	9,584,200	146,382	499	1	83
Mill Creek Reservoir	1946	370,000	1,335,000	261	45	0	0	570,000	1,425			80
Canton Reservoir	1938	0	66,330		100	0	0	645,150	19,880			100
Denison Reservoir Red River	1938	4,780,100	11,315,800	137	100	8,000,000	236,322	11,822,600	195,440	48	−17	99

Fort Gibson Reservoir	1941, 1944, and 1946.	1,367,500	9,407,500	588	27	1,730,000	34,600	4,080,000	77,700	136	125	89
Great Salt Plains Reservoir	1936	0	194,000		100	0	0	270,000	31,930			100
Hulah Reservoir Caney River	1936	123,600	931,000	653	9	1,018,000	17,300	2,474,800	21,530	143	24	96
Kaw levee project Arkansas River	1936	0	10,000		0	0	0	0	0			
Oklahoma City floodway	1946	1,089,000	2,100,000	93	0	0	0	0	0			
Oologah Reservoir	1938 and 1946	375,000	7,260,000	1,836	0	3,225,000	38,400	8,050,000	75,200	150	96	.4
Heyburn Reservoir	1946	121,000	212,500	76	56	165,000	4,000	387,000	7,320	135	83	100
Tenkiller Ferry Reservoir	1938 and 1946	606,250	1,983,500	227	0	893,750	15,600	1,569,000	31,900	75	104	72
Wister Reservoir	1938	660,000	1,586,521	140	97	1,540,000	33,000	1,187,536	39,150	−23	19	100
Detroit Reservoir	1938	2,272,000	6,904,000	204	75	243,000	3,640	1,191,000	7,661	390	105	17
Dorena Reservoir	1938	406,000	2,040,000	402	99	280,000	1,970	602,000	2,966	115	51	99
Fern Ridge Reservoir	1938	778,000	228,000	−70	100	653,000	11,670	829,000	12,661	27	8	99
Lookout Point Reservoir	1938	12,280,000	23,444,000	91	30	1,258,000	5,230	1,826,000	9,667	45	85	20
Conemaugh Reservoir	1936 and 1938	12,806,000	27,890,200	118	66	2,872,000	6,800	5,253,000	7,150	83	5	24
East Branch Clarion Reservoir	1938 and 1944	3,600	5,250	46	0	80,600	1,355	240,450	2,072	200	55	59
Sunbury flood project	1936 and 1941	0	184,000		100	0	0	0	0			
Williamsport flood project	1936 and 1948	0	731,000		99	0	0	0	0			
York flood project	1936 and 1938	0	117,000		100	0	0	532,000	1,958			98
Fort Randall Reservoir	1944	4,943,500	19,635,000	287	4	1,516,000	96,500	5,712,000	115,830	277	20	23
Fall River Basin project	1941	0	36,987		0	5,000	315	71,000	952	1,320	202	0
Oahe Reservoir	1944	14,929,000	41,820,000	180	0	6,450,000	(3)	17,120,000	342,400	165	(2)	1.5
Center Hill Reservoir	1938	1,550,000	3,069,000	98	84	2,750,000	22,770	3,712,000	38,659	35	70	91
Belton Reservoir	1946	775,000	2,956,000	281	0	1,949,000	29,800	2,720,000	33,000	40	11	4
Benbrook Reservoir	1945	35,992	1,778,000	4,839	3	483,600	6,200	2,516,700	13,448	420	117	87
Fort Worth floodway	1945	0	1,042,600		0	0	0	0	0			
Garza-Little Elm project	1945	293,431	3,082,300	952	1	999,830	18,150	4,930,000	64,937	393	258	11
Grapevine Reservoir	1945	158,424	1,733,055	994	3	513,624	11,380	2,522,639	18,775	391	65	35
Hords Creek Reservoir	1941 and 1944	0	0			37,700	1,180	208,000	3,027	452	157	94
Lavon Reservoir	1945	754,000	2,170,400	188	4	1,012,570	15,580	2,908,600	25,718	187	65	72
San Angelo Reservoir	1941 and 1944	120,000	1,167,600	873	22	503,600	13,600	3,485,900	19,700	592	45	27
Texarkana Reservoir	1946	3,200,000	8,000,000	150	5	1,900,000	104,000	3,700,000	155,100	95	49	13
Whitney Reservoir	1941 and 1944	937,120	10,242,200	993	25	840,000	20,200	3,901,000	54,816	364	94	68
Philpott Reservoir	1944	80,000	330,000	312	0	140,000	4,300	490,000	9,400	250	119	9
Mud Mountain Dam	1936	0	0			29,000	1,200	24,000	2,372	−17	98	100
Sutton Reservoir	1938	7,122,000	6,224,000	−13	0	1,437,000	3,100	1,366,000	10,256	−5	231	10
Subtotal, flood-control projects		129,531,657	384,873,180	197		83,523,259	1,898,606	213,166,035	2,956,992	155	56	
RIVERS AND HARBORS PROJECTS												
Demopolis Reservoir	1945	0	733,000		0	218,000	95,141	1,500,000	95,000	588	0	2
Arkansas River navigation	1946 and 1950	29,418,700	37,515,000	28	0	23,034,200	378,832	22,789,000	233,832	−1	−38	1
Jim Woodruff Reservoir	1945 and 1946	0	96,000		25	0	0	1,947,000	67,133			5
Buford Reservoir	1946	2,075,000	11,218,000	441	1	1,540,000	49,060	2,647,000	62,000	72	25	1
Mississippi River between Ohio and Missouri Rivers, Chain of Rocks Canal	1945	950,000	3,910,000	312	91	530,000	1,800	789,000	2,540	49	41	60
Mississippi River to Minneapolis	1930, etc	0	0			9,728,542	143,168	18,368,525	221,478	89	55	98
Ohio River Canal	1910	0	0			511,700	(3)	577,700	(3)	13		100
Cheatham lock and dam	1946	34,000	800,000	2,253	0	200,000	2,200	1,274,000	6,000	537	173	3

See footnotes at end of table, p. 30.

Data on relocations and lands for 182 projects comprising fiscal year 1951 program—Continued

Projects	Relocations					Lands						
	Authorization estimate		Fiscal year 1952 estimate			Authorization estimate		Fiscal year 1952 estimate				
	Date of authorization	Estimate of relocation cost	Estimate of relocation cost	Percent increase over authorization estimate	Percent of completion of relocation program	Estimate of land cost	Number of acres	Estimate of land cost	Number of acres	Percentage of increase over authorization estimate		Percent of completion of land acquisition program
										Cost	Acreage	
RIVERS AND HARBORS PROJECTS—con.												
Gulf Intracoastal Waterway, La	1925, etc	$1,625,000	$4,013,000	147	0	0	0	0	0			
Pearl River navigation project	1935	22,000	44,000	100	88	0	0	$1,300	161			100
Fort Peck Dam	1933, 1935, 1938, and 1944.	0	0			$4,235,000	212,000	4,235,000	289,009	0	36	100
Great Lakes-Hudson River Waterway	1935 and 1945	3,285,000	6,684,000	103	75	0	0	0	0			
Bonneville Dam	1933, 1935, and 1937.	4,213,910	7,166,910	70	100	942,046	5,000	1,669,046	7,113	77	42	97
McNary lock and dam	1945	6,298,000	36,800,000	484	25	1,202,000	12,000	11,000,000	46,224	915	285	27
Reconstruction of locks, 2	1909	0	0			1,800	.15	20,100	1.3	1,017	767	3
Morgantown lock	1909	814,800	221,000	−73	13	6,600	19.6	369,300	42.0	5,495	114	93
Chief Joseph Reservoir	1946	249,000	494,000	98	6	239,000	21,666	473,000	21,278	98	−2	7
Subtotal, rivers and harbors projects.		48,985,410	109,694,910	123		42,388,888	921,426.75	67,659,971	1,051,811.3	60	14	
Grand total		178,517,067	494,568,090	177		125,912,147	2,820,032.75	280,826,006	4,008,803.3	123	42	

[1] Cherry Valley project being constructed by local interests with Federal contribution based on proportionate benefit allocation of cost of Jacksonville Reservoir project which will not be needed under local interests' development.

[2] Prior to enactment of the 1938 Flood Control Act, the Federal Government did not bear the cost of relocations. The 1938 act, and the subsequent 1941, 1944, and 1946 acts, placed this burden on the Federal Government. This may be a partial explanation of why the Corps of Engineers failed in some cases to make any allowance whatever for relocations in the authorization estimates. The fact remains, however, that during the same period of time, also covered by these acts, the Corps on a majority of the projects made an allowance for relocations in the authorization estimates.

[3] Not available.

Mr. DONNELLY. This schedule shows all projects of the 182 now under construction involving relocations and lands. The underestimate in the survey report for relocations is 177 percent, and the underestimate in the survey report for lands is 123 percent in cost, and 42 percent in acreage.

With respect to the lands, let me invite the committee's attention to the McNary Dam which was authorized in 1945. The lands have increased in cost 815 percent and in acreage 285 percent, when the land-acquisition program was only 27 percent complete.

Mr. KERR. What percentage of that land was secured by action of the court?

Mr. DONNELLY. I do not know how much they had to condemn, Judge; but you will notice that they had to increase their acreage. The dollars and cents involved in condemnation is one thing. That would affect the increase in cost, but the acreage has increased 285 percent.

Mr. KERR. What was the cost for the acreage?

Mr. DONNELLY. I do not know what it would be in cost. We did not have that information.

Mr. KERR. A large percentage of that cost was due to a judgment of the court.

Mr. DONNELLY. That may be true, of course, but it would not be true of the increase in acreage.

INADEQUACY OF SURVEY REPORT AS A BASIS FOR APPROPRIATION OF CONSTRUCTION FUNDS

Now, General, all these figures that are now before the Committee were taken from the survey reports which were printed up as congressional documents.

The corps has told the committee in the past few months that the survey report estimating for lands is inadequate. Do you have any comment you want to make on that, sir?

General PICK. That our process of estimating the amount of land required is inadequate?

Mr. DONNELLY. That the estimate in a survey report for a project for the land item is an inadequate estimate.

General PICK. You mean in any survey report?

Mr. DONNELLY. Well, in almost every survey report in the 182 projects now under construction.

General PICK. If I follow these figures here, it looks like it; yes.

Mr. DONNELLY. Yes, sir. Now, General, cannot the planning be advanced for the benefit of this committee and crystallized into a more advanced report, which we might call a planning report, before the corps asks this committee for initial construction funds?

General PICK. There are so many figures here I have not been able to see exactly what is in front of me, but on the question which you are going into now, Mr. Donnelly, if there has been an increase in the amount of land to be acquired I feel sure that that was included on the data sheet that was presented to Congress the year that that increase was determined, with an explanation to the committee why. In other words, if there has been a 20 percent increase in the acreage on the data sheet, that has been given to the committee each year

as it went along, to try to keep the committee up to date on these increased estimates.

Now I was trying to follow one project here, to use what had happened on it. On the Garrison project there we were talking about the number of acres in the authorization estimate, 480,000. That indicates there that the number of acres is the same, 480,000 but the price has jumped from $6,100,000 to $16,840,000.

Mr. DONNELLY. That is correct.

General PICK. Now, then, that is what I was telling you awhile ago. We had those Indian lands involved in there, and the estimate that was made on that land at that time was what we thought the land would sell for when we wrote the report, but you cannot buy that land for that now. The truth of the matter is if we had not bought most of it when we did we would be paying many times that for it now because they have struck oil around there.

Mr. DONNELLY. General, that is exactly the point. Members of your staff have told me that the land acquisition program will follow the preparation of the survey report as much as 10 years.

General PICK. The number of acres of land that we need for a project ought to be relatively correct in the survey report; I agree with that, sir.

Mr. DONNELLY. Can that be, even though the land acquisition will not take place for as much as 10 years after the survey report is written?

General PICK. Yes, for the project that is indicated in the survey report.

In other words, if you are going to put a head of water in there of 100 feet you have estimated your land on that, and you ought to be correct 10 years from now as much as you are today, but 10 years from now when you go to build the dam if you raise that water 10 feet, you see where you are getting, you are getting into the upper part of the basin where it is flattening out and the land acreage will increase tremendously. So, we ought to estimate very closely the amount of land we need for a project, I agree with that, and if the project is not changed that ought to remain the same. I do not know whether I am answering your question or not, Mr. Donnelly, but I am trying to.

Mr. DONNELLY. I understand you are.

You say you should be able to do it in the survey report, and yet we have these figures before the committee for every single project under construction, and we find almost universally that the land estimates have been grossly inadequate in the survey report.

Mr. KORTH. You mean the number of acres or the cost?

Mr. DONNELLY. Either or both.

General PICK. In your other chart you show that 21 percent of the cost of these projects was for authorized project extensions. That would have some effect on the real estate, I believe. I have not analyzed each one of them. Here is one that goes contrary to the trend. We estimated 236,000 acres originally, and in 1952 we do not need but 195,000.

Here is one where we said we needed 34,000, and now in 1952 we need 77,000.

Here is one where we did not need any land. That is a very interesting project, the Great Salt Plains Reservoir where we estimated we

did not need any la ıd at all, and in 1952 we indicate that we need 31,930 acres. So, you would have to analyze each of these projects to see what has happened as to whether these conditions changed, but when we write a report and we plan structures that are to be authorized by Congress that acreage should remain the same.

Mr. DONNELLY. Well, General, has the acreage increased on certain projects after the survey report because of authorized project extensions?

General PICK. That is the only thing that I know of that could increase the real estate provided you had made accurate estimates of the amount required.

Mr. DONNELLY. And the unforeseen conditions that you might encounter after the survey report is written?

General PICK. Yes. That has happened in the Missouri Basin and in other basins. Many of these projects come in sections of the country which have not been mapped. We have had to go in and map them accurately and get the coast and geodetic survey to come in and make topographic sheets of the area and put accurate contours in there.

After that has been done, then we can make a very close estimate as to the elevation to which the water will be raised, and when we do that we can figure the acreage with a great deal of accuracy.

Now, then, here is another thing that is very difficult to do. When you go around a 1,600 mile perimeter of a reservoir, when you go to establish a taking line and you go along to buy that land along that line you are confronted with splitting property; you are confronted with severance damages, and you are confronted with taking a man's cropland from him and leaving him some woodland and a plot where his house may be, so that he can't stay there and farm, he has got to get rid of it. So, in many instances the severance cost would be so high that you could buy the whole thing cheaper. You have that to figure out all of the way around with taking land and that will tend not to decrease your acreage, but to increase it.

Mr. DONNELLY. That is right.

General PICK. We have some cases out in California now, where in some cases people are demanding that we take much more land than we need for the reservoir itself because they say we are ruining their property; they have to move off and leave it. So there is always going to be a difference in there, Mr. Donnelly, over and above an equal tract for this certain number of acres.

Mr. DONNELLY. In the survey report?

General PICK. That is right. We try to tell the committee when we find out that that has increased in these data sheets that we prepare for them.

Mr. DONNELLY. General, on this question of maps I am glad you brought that out. On the Fort Randall project we find that the maps used were 1890 small contour maps and were inadequate for the purpose of estimating. That also is one factor as to why the survey report land estimate may not be accurate; is it not?

General PICK. That is correct. We had to resurvey the whole Missouri Valley, and, of course, you realize why everybody wanted something done in the Missouri Basin at that time, because they had just gone through that 11-year period of drought out there, and if we could have bought that land during that drought period out there for

the Garrison Reservoir we could have gotten it for almost anything you wanted to pay for it, and I think today its average is about $35 an acre. Up to that time it never sold, I am told, for above $5 an acre.

Inadequacy of Present Planning Procedure for Appropriation of Construction Funds

Mr. Donnelly. General, to put the whole thing in proper perspective, on April 3 you told this committee in the hearings that the procedure is the authorization of a project, the appropriation of planning funds, the completion of a definite project report by the Corps of Engineers and drawing plans and specifications, all of those steps occurring before the Corps of Engineers asks this committee for initial construction funds. Do you recall your testimony to that effect?

General Pick. I do not recall just that order, but I think that is what I said, sir.

Mr. Donnelly. Now, General, a definite project report, under your orders and regulations is a formal document, is it not?

General Pick. It is a formal working document; yes, sir.

Mr. Donnelly. And in examining your orders and regulations, General, I found that even the size of the paper is prescribed, the submission to the Chief of Engineers is prescribed, the distribution and the like. In examining this one that your office kindly made available, this definite project report on Philpott Reservoir, Smith River, Va., I found this definite project report was completed before initial funds were requested for Philpott Reservoir, and with this definite project report was a comparison with the items in the earlier survey report for this project, that most of these items we see in these schedules and details were taken into account in this definite project report.

I would like to invite the committee's attention to the very orderly way in which this document is compiled. We have a comparison table showing the difference item by item between the definite project report and the survey report. The survey report was the report on which Congress authorized the project. We find a comparison in dollars and cents, and we also find a difference in the cost-benefit ratio. The survey report cost-benefit ratio was a bit optimistic. That cost-benefit ratio was 1.3. The definite project report cost-benefit ratio was lower, 1.1.

Then we find in the definite project report a one page syllabus, and we find a 31 page narrative summary of the entire plan. The 31 page narrative summary is similar to the nontechnical report made in the survey report to Congress, upon which this project was authorized.

We have obtained from the Corps of Engineers, for the benefit of the committee, a statement with respect to the status of the definite project reports on all of the 182 projects now under construction, and we find that the corps had completed only 25 definite project reports out of the 182 projects at the time the corps requested initial construction funds.

We find also in "b" in this document that in an additional 18 projects sections of the definite project report had been completed, or definite project studies had reached an advanced stage.

(This document is as follows:)

STATUS OF DEFINITE PROJECT REPORT FOR EACH OF 182 PROJECTS OF FISCAL YEAR 1951 PROGRAM WHEN INITIAL CONSTRUCTION FUNDS WERE REQUESTED BY THE CORPS OF ENGINEERS

1. Review of the history of the 182 projects which comprised the civil works program for the fiscal year 1951 indicates the status of definite project reports and studies when initial construction funds were first requested from the Bureau of the Budget as follows:

Status	*Number of projects*
(*a*) Definite project report complete for entire project	25
(*b*) Sections of definite project complete or advanced stage of definite project studies	18
(*c*) Survey report data used as basis, with costs brought up to date by indexes in some cases	89
(*d*) Definite project report procedure not required	50
Total	182

2. The tabulation herewith shows the individual projects falling into each of the categories summarized above.

3. This analysis shows for about 50 percent of the fiscal year 1951 program initial requests for construction funds were based on complete definite project reports, sectional definite project reports and studies, or the definite project report procedure was not required. For the remaining 50 percent, initial construction fund requests were based on survey reports with estimates brought up to date in more recent years by application of cost indexes. Definite project reports or studies were available for about one-third of the projects for which the DPR procedure was required.

4. In consideration of this analysis it should be borne in mind that for some 40 projects, of the list of 182, construction funds were first requested for the fiscal years 1938 and 1939 or for the fiscal years 1945, 1946, and 1947. In the first instance, involving the fiscal year 1938–39 projects, lack of time and nonavailability of planning funds after enactment of the first Flood Control Act of 1936 precluded the preparation of definite project reports and it was necessary to utilize survey report data in making requests for construction funds in most cases. The second instance, involving fiscal years 1945, 1946, and 1947 projects, illustrates the requests for construction funds which were made toward the end of and immediately after World War II, in order to place under way a postwar civil works program.

Status of definite project report for each of 182 projects of fiscal year 1951 program when initial construction funds were requested by Corps of Engineers

A. DEFINITE PROJECT REPORT COMPLETE FOR ENTIRE PROJECT

Name	*Date of authorization*
Flood control:	
Bull Shoals Reservoir	1941
Lawrenceburg	1938
Fall River Reservoir	1941
Hutchinson	1936
Ashland	1938
Covington	1938
Maysville	1938
Adams	1941
North Adams	1936 and 1941
Harlan County Reservoir	1938 to 1944
Hoosick Falls	1936 and 1941
Hornell	1936 and 1938
Great Salt Plains Reservoir	1936
Hulah Reservoir	1936
Oologah Reservoir	1936 and 1946
Heyburn Reservoir	1946
Wister Reservoir	1938
Sunbury	1936 and 1941
Fort Randall Reservoir	1944
Center Hill Reservoir	1938
Memphis, Wolf River and Nonconah Creek	1937 to 1946
Garza-Little Elm Reservoir	1945
Lavon Reservoir	1945
Philpott Reservoir	1944
Rivers and harbors: Morgantown lock and dam	1909

Total, 25 projects.

Status of definite project report for each of 182 projects of fiscal year 1951 program when initial construction funds were requested by Corps of Engineers—Con.

B. SECTIONS OF DEFINITE PROJECT COMPLETE OR ADVANCED STAGE OF DEFINITE PROJECT STUDIES

Name	*Date of authorization*
Flood control:	
Norfork Reservoir	1938 and 1941
Farmington Reservoir	1944
Grand Tower drainage and levee district	1938
Miller Pond drainage and levee district	1938
Savage River Reservoir	1946
Dillon Reservoir	1938
Massillon	1938
Denison Reservoir	1938
Kaw	1936
Tenkiller Ferry Reservoir	1938 and 1946
East Branch Clarion River Reservoir	1938 and 1944
Fall River Basin	1941
Grapevine Reservoir	1945
Rivers and harbors:	
Jim Woodruff lock and dam	1945 and 1946
Buford Dam	1946
Port Sanilac Harbor	1945
St. Anthony Falls	1937 and 1945
Chief Joseph Dam	1946

Total, 18 projects.

C. SURVEY REPORT DATA USED, WITH COSTS BROUGHT UP TO DATE BY INDEXES IN SOME CASES

Name	*Date of authorization*
Flood control:	
Tucson diversion channel	1948
Blakely Mountain Reservoir	1944
Narrows Reservoir	1941 and 1944
Nimrod Reservoir	1938
Red River levees and bank stabilization below Denison Dam	1946
West of Morilton	1936 and 1944
Cherry Valley Reservoir	1944
Folsom Reservoir	1944 and 1949
Isabella Reservoir	1944
Los Angeles County drainage area (exclusive of Whittier Narrows Reservoir)	1936 to 1941
Merced County stream group	1944
Pine Flat Reservoir	1944
Whittier Narrows Reservoir	1941
Mansfield Hollow Reservoir	1941
Winsted	1941
Central and southern Florida	1948
Clark Hill Reservoir	1944
Lucky Peak Reservoir	1946
Columbia drainage and levee district	1936
Chouteau, Nameoki, and Venice drainage and levee district	1936
Degognia and Fountain Bluff drainage and levee district	1936
East Cape Girardeau and Clear Creek drainage and levee district	1936
East St. Louis and vicinity	1936
Farm Creek Reservoirs	1944
Galena	1944
Prairie du Rocher and vicinity	1946
Wood River drainage and levee district	1938
Cagles Mill Reservoir	1938
Cannelton	1936 and 1937
Indianapolis	1936 and 1938
Evansville	1936 and 1937

Status of definite project report for each of 182 projets of fiscal year 1951 program when initial construction funds were requested by Corps of Engineers—Con.

C. SUMMARY REPORT DATA USED, WITH COSTS BROUGHT UP TO DATE BY INDEXES IN SOME CASES—continued

Name	*Date of authorization*
Flood control—Continued	
New Albany	1938
Coralville Reservoir	1938
Little Sioux River	1947
Missouri River agricultural levees	1944
Kansas City	1936 and 1944
Wichita and Valley Center	1936
Dewey Reservoir	1938
Louisville	1938
Newport	1937
Wolf Creek Reservoir	1938
Bayou Teche and Vermilion River	1941
Mermentau River	1941 and 1946
Shreveport	1944
Cumberland and Ridgeley	1936 and 1946
Knightville Reservoir	1938 and 1941
Red Run	1948
Red Lake and Clearwater Rivers	1944
Red River of the North	1948
Chariton River	1944
Perry County levee district Nos. 1, 2, and 3	1936
Jemez Canyon Reservoir	1948
Montour Falls	1941
Mount Morris Reservoir	1944
Olean	1946
Portville	1946
Buggs Island Reservoir	1944
Baldhill Reservoir	1944 and 1946
Garrison Reservoir	1944
West Fork of Mill Creek Reservoir	1946
Canton Reservoir	1938
Fort Gibson Reservoir	1941, 1944, and 1946
Oklahoma City floodway	1946
Detroit Reservoir	1938 to 1948
Dorena Reservoir	1938
Fern Ridge Reservoir	1938
Lookout Point Reservoir	1938 and 1950
Umpqua River and tributaries	1941
Conemaugh River Reservoir	1936 and 1938
Williamsport	1936 and 1948
York	1936 and 1938
Oahe Reservoir	1944
Belton Reservoir	1946
Benbrook Reservoir	1945
Fort Worth floodway	1945
Hords Creek Reservoir	1941 and 1944
San Angelo Reservoir and floodway	1941 and 1944
Texarkana Reservoir	1946
Whitney Reservoir	1941 and 1944
Mud Mountain Reservoir	1936
Sutton Reservoir	1938
Rivers and harbors:	
Demopolis lock and dam	1945
Sacramento River (Sacramento deep-water channel)	1946
San Diego River and Mission Bay	1946
Mississippi River between the Ohio and Missouri Rivers (Chain of Rocks canal)	1945
Cheatham lock and dam, Cumberland River	1946
St. Marys River, new power plant	1945
McNary lock and dam	1945
Schuylkill River above Fairmount Dam	1946
Total, 89 projects.	

Status of definite project report for each of 182 projects of fiscal year 1951 program when initial construction funds were requested by Corps of Engineers—Con.

D. DEFINITE PROJECT REPORT PROCEDURE NOT REQUIRED

Name	*Date of authorization*
Flood control:	
Sacramento River major and minor tributaries	1944
Rosiclare	1948
Muskingum River Reservoirs	1938 to 1946
Willamette River (bank protection)	1936 to 1950
Rivers and harbors:	
Nome Harbor	1917 to 1948
Wrangell Narrows	1925 to 1945
Arkansas River and tributaries (part for which appropriation requested)	1946 and 1950
Crescent City Harbor	1918 and 1945
Potomac River (north side, Washington Channel)	1935
Jacksonville Harbor	1907 to 1945
Tampa Harbor	1899 to 1950
Savannah Harbor	1874 to 1946
Illinois waterway	1927 to 1946
Mississippi River between the Ohio and Missouri Rivers (regulating works)	1881 to 1930
Mississippi River between the Missouri River and Minneapolis, excluding St. Anthony Falls and lock 19	1930 to 1950
Ohio River:	
Lock and dam construction	1910 and 1918
Open channel work	1827 to 1930
Missouri River, Kansas City to Sioux City	1927 and 1945
Calcasieu River and Pass	1937 to 1946
Gulf Intracoastal Waterway (New Orelans district)	1925 to 1946
Pearl River	1935
Waterway from Empire to Gulf of Mexico	1946
Portland Harbor	1836 to 1946
Baltimore Harbor and channels	1917 and 1945
Boston Harbor	1825 to 1946
Fall River Harbor	1930 and 1946
St. Mary's River, navigation features	1870 to 1946
Missouri River, Kansas City to mouth	1912 to 1945
Fort Peck Dam	1935 to 1944
Newark Bay, Hackensack and Passaic Rivers	1907 to 1945
New York and New Jersey channels	1935 and 1950
Buffalo Harbor	1912 to 1945
Great Lakes to Hudson River waterway	1935 to 1945
Hudson River Channel	1913 to 1937
New York Harbor, entrance channels and anchorage areas	1884 to 1937
Cleveland Harbor	1896 to 1946
Lorain Harbor	1899 to 1945
Columbia River and tributaries	1935 to 1945
Bonneville lock and dam	1935 and 1937
Coos Bay	1910 to 1948
Locks 2, Monongahela River	1909
Georgetown Harbor	1945 and 1948
Houston ship channel	1905 to 1948
Gulf Intracoastal waterway (Galveston district)	1925 to 1950
Sabine-Neches waterway	1912 to 1950
Trinity River, channel to Liberty	1945 and 1946
Norfolk Harbor	1884 to 1948
York Spit Channel	1905 to 1945
St. Thomas Harbor	1937
Grays Harbor and Chehalis River	1896 to 1948
Total, 50 projects.	

General, definite project studies are the preliminary and tentative studies that go into the definite project report when that is later completed; is that a fair statement?

General PICK. Well, a section of the definite project report——

Mr. DONNELLY. No; my question was as to definite project studies.

General PICK. Definite project studies would be for a particular item of work or a portion of a project that was going to be included in a separate contract as a general rule, and all of those together would go together, and when put together would form the definite project report.

Mr. DONNELLY. Then do I understand that a definite project study is tantamount to a sectional definite project report?

Mr. SLICHTER. It could be or otherwise.

Mr. DONNELLY. Generally speaking, is not a definite project study a preliminary form or part of the definite project report?

Mr. SLICHTER. It would require quite a description of that report to analyze that. However, a definite project study could be an analysis of the design of a structure, it could be hydrological conditions affecting it. It is information which goes together to prepare the design of the project in order to proceed with the plans and specifications.

General PICK. It comes up with design criteria.

Mr. DONNELLY. But it is short of the definite project report, is it not, General?

Mr. SLICHTER. Complete, yes.

General PICK. Yes, but with a definite project report we give you the same information for the whole job.

Mr. DONNELLY. Well, that is information, then, that this committee needs in order to have a reevaluation of the cost-benefit ratio at the time the corps requests initial construction funds, is that correct?

General PICK. I do not think the committee would be particularly interested in design criteria. In other words, would the committee be interested in how you are going to pour concrete, what kind of aggregate you are going to use, how it would be formed, or the working conditions under which it would be poured or the compacting of earth into a dam? I do not know. I cannot speak for the committee, of course, but I doubt whether it would be interested in having all of that data.

Mr. DONNELLY. General, I am inclined to agree with the view you just expressed, and that is why I got this specimen of a definite project report and brought it up here to show it to the committee.

General PICK. Yes.

Mr. DONNELLY. Those final data you just referred to are contained in the appendix to the report. The 31-page narrative summary in the beginning is in nontechnical language that this committee would understand, just as Congress understands the survey report.

General PICK. Yes. You indicated on the memorandum you have on there, in section c. you say, "Survey report data used as basis, with costs brought up to date by indices in some cases", 89 of the projects, 89 of the 182.

Mr. DONNELLY. General, I did not prepare this; your own office did.

General PICK. I just wanted to point out there that that is a broad statement there. I doubt whether b. and c. would not be thrown together before they are considered—now if you have enough data in the survey report to allow the design to be made, then that would take the place of a definite project study, so that the two together, in my opinion, 89 and 18 ought to be thrown in together. I wish we had enough data on all of the survey reports so that we would not have to go through that later analyzing.

Mr. DONNELLY. Yes, but until you go through that analyzing the Appropriations Committee cannot have a sound cost estimate upon which to determine whether to construct a project, is that right?

General PICK. I cannot speak for the committee; I do not know. I have the impression that the committee feels that we have not given them the amount of information that other agencies of Government are providing for them. If that is the case we ought to know how we are lacking and what we are lacking.

Mr. DAVIS. Of course, we do not have any other agencies which come before us doing a similar type of work. The Bureau of Reclamation, for instance, presents their request to the Subcommittee on the Department of the Interior. We have nothing to compare it with.

General PICK. You know, so far as the Bureau of Reclamation is concerned, the Bureau of Reclamation never makes known their estimates when they let work.

Mr. DAVIS. They never make known their estimates when they let work?

General PICK. No, they never make known how much the Government figures that work is worth. They open a contract and get 15 bids, they get bids, but a fellow would never know what the Government estimate is.

We put out more information than any other construction agency in the Government. We have always tried to give Congress everything they wanted.

Now, it seems to be Mr. Donnelly's opinion and, perhaps, that of his staff, that we have not been giving them enough. Well, I assure you we are perfectly willing and ready to give the committee any and all of the information they will ask for, sir. This is all factual data that he has here; this is factual data. Most of this has been published, has it not, Mr. Donnelly?

Mr. DONNELLY. That is correct with respect to some. The other information has been supplied by the corps to the committee staff on request.

General PICK. This is all factual data. We have nothing to hide.

You are talking about these definite project reports. This happens to be a small one. You know there are some others that would stand up like this [indicating].

RECOMMENDED IMPROVEMENT FOR FURNISHING APPROPRIATIONS COMMITTEE VITAL DATA

Mr. DONNELLY. I do not want to be confused and I do not want you to be confused. I am not talking about this whole book. I am talking about the 31 pages in the front, the narrative summary which is in nontechnical terminology, and which is analogous to this which was printed by Congress, this in my left hand, this survey report.

General PICK. I do not know what is in that, but if the committee were to ask us to present these we would certainly do it. I do not know how much it would cost us to get it up. How many projects do we have in this year's budget?

Mr. BEARD. About 160, including planning items.

General PICK. Suppose they average 10 pages, that is 1,600 pages.

Mr. DONNELLY. I would imagine that they would average 30 pages.

General PICK. Now, that is a lot of reading. When we come before the committee they have always made us boil stuff down just as low as we can. I am not objecting to giving it to the committee I just want to give the committee what they want, but I want the committee to know that it costs money to get this up. Now, if it is desired that we do that, and it would run that many pages, we would certainly provide it.

Now, then, I would like to say to the committee, do not make me spend the time to go out and make up all of these definite project reports and have them all completed and have them finally in writing before I come before Congress and ask for funds to start a project.

Mr. DONNELLY. You should not have to do that, and your own subordinates in the last 6 weeks, in informal discussions which I have had with them in your office, have expressed their personal views, not yours, of course, because they had not cleared with you in advance, that the preparation of a planning report between the survey report and between the definite project report would be beneficial to the Corps of Engineers and I, in my view, feel it would be beneficial to this committee and to the Appropriations Committee of the Senate because it would formalize planning at some stage before the initial construction funds were appropriated.

General PICK. My staff has never told me that, sir. I am positive if they told you that they were sincere. They would not broach it to me to change a system which is in effect now unless there were indications from the committee that they wanted it changed.

Now, then, Mr. Donnelly, the role of the Chief of Engineers of the United States Army is the most difficult one in Washington. I have got to work for everybody and his brother now.

Now, when we go to make up one of these budgets we take it into the Military Establishment over yonder and into the Army Comptroller's Office over there and to people who know nothing about what we are talking about around here, and I have to go through all of that, and they want this and they want that.

Now, then, when they get through with it I can take it over to the budget. Now, the budget has very definite and exacting rules under which they want me to work, and things that they want me to give. These data sheets which we furnish the committee they have asked for, and they want those same data sheets, and they are very meticulous about how to get them and when to get them.

Now, then, if we make up this planning report, and I do not object to it, I do not believe that will satisfy the Bureau of the Budget. They will want the data sheets made up, and I feel sure we will have to make up the data sheets because in running over them, Mr. Chairman, project by project, 30 pages is too much to have in front of you and follow it very closely.

Mr. DONNELLY. If I may interject for a minute, the Public Works Committee, though, has this 30- or 40-page document known as the

survey report before it, and the function of the Public Works Committee is no more important than the function of this committee. The benefit-cost ratio at the time of the survey report, which is considered by the Public Works Committee, may be different by the time the Appropriations Committee goes into it.

General PICK. They get these reports months ahead of time, and they have the staff go through them and analyze them.

Mr. DONNELLY. General, you have a quotation, or the Corps of Engineers has, in one of your manuals prepared in 1949 or 1950, which says this, paraphrasing it, that the definite project report is prepared to close the gap in engineering planning between the survey report and the time that you break ground and start construction.

General PICK. That is what it was designed for.

Mr. DONNELLY. Yes, sir, but now the corps says you do not want to complete a definite project report for the whole project until after construction is under way; is that correct?

General PICK. Mr. Donnelly, most of the members of the committee know that when we get projects authorized there is a great demand for some of them to be built, they want you to start to work on them right away. Now, that project can be analyzed and it can be determined that you can start preliminary work there that has got to be done before you start the big work, and that would save 1 or 2 years maybe in the completion of the project. They want you to go to work.

Now, we have always tried to work with the people and with the Congress. Members of Congress are very much interested in projects which we build, and they want us to get to work just as soon as we possibly can. I have got a lot of projects right now that people are after me every day to start work on, and we have not even finished the survey report on them.

Now, if the committee desires to have the definite project report completed in all of its details and bound and sent to the committee before any work is started that will mean that from the time the resolution is passed for the survey until the time the job is completed, instead of being the amount of time I tell you of 5 or 6 years to do the job and get started, it will be about 8 or 9 years before anything will be done on it.

NEED FOR THE NEW PLANNING REPORT

Mr. DONNELLY. Well, I certainly follow you there, and that is why I discussed with your representatives this subject of a planning report.

General PICK. Now, do you think it is possible to prepare a planning report that would give the committee the information that it is entitled to and ought to have?

Mr. DONNELLY. I believe that it is possible and practical and would be an ideal, as a matter of fact, an ideal basis upon which this committee could evaluate individual projects before they appropriate initial construction funds.

General PICK. Well, if that is the opinion of the committee, of course, that is what we will do.

Mr. DONNELLY. That has been my own opinion, as you understand.

General PICK. Yes.

Now, I do not know what the committee will decide on that, but I can assure you, and I can assure the committee that all I want to be is helpful.

NEED FOR MORE CURRENT COST ESTIMATES

Mr. DONNELLY. Well, General, now that we have discussed the plan and procedure in detail here, let me ask you this question: As of today your field offices have sent in cost estimates for the projects now under construction to be used for the 1953 budget, have they not?

General PICK. Yes.

Mr. DONNELLY. And your office was good enough to furnish me figures which show that the figures used by this committee in the pending bill, and that pending bill is now over in the Senate, are increased tentatively $116,000,000.

General PICK. Now you are talking about something I know nothing about. We have not gotten into the budget. I do not know the basis for any changes like that, and those things are not final until I have approved them myself. I cannot help you very much.

Mr. DONNELLY. General, the figures that were before this committee in April, May, and June, when this committee considered the current construction program had been compiled last July 1950, so that they were at least 7 or 8 months old at the time this committee considered them. In that period of time your field offices had discovered unforeseen conditions and inadequacies and changes in local needs and relocations and lands, and the like, which would have increased the cost of the program, and that is in addition to the rise in construction costs.

To give an illustration, in April of this year one of your representatives advised this committee, in response to a question, that the cost of the central and southern Florida flood-control project was $58,129,000—that is a figure of $70,000,000 less local contributions of $12,000,000, approximately—yet at that very time the Jacksonville District Office had made a draft of a definite project report and had found that phase would cost $93,000,000. So, my point is that if these Congressmen are to have the opportunity to exercise their important legislative function each year they should have current, up-to-the-minute cost estimates from the corps. Do you agree with that, sir?

General PICK. As I say, you are talking about something I have not considered at all, and I know nothing about. You say this was in a definite project report?

Mr. DONNELLY. In the draft of a definite project report.

General PICK. Were there any changes in the scope of the work?

Mr. DONNELLY. I discussed that with Mr. Slichter and Mr. Beard, I believe. It was the first phase. It seemed to be the same as that covered by the survey report with some minor changes.

Mr. SLICHTER. I can give you information on that if you would like to have it.

That document which you identified as the draft of a definite project report was some definite project studies of the basic hydrology of the entire over-all central and south Florida project. It was prepared

specifically for a conference in the field, I think, which was held in June. It was transmitted, not formally to the Chief of Engineers, until the last 2 weeks when we finally received it.

We used it in June as a draft document to review the field studies. I might mention that there are numerous new thoughts in that report which, if adopted, might modify the cost.

However, the corps has not adopted any changes in the first phase of the project. There are such things proposed as abandoning certain pumping plants and substituting others. While I have not analyzed the cost of those items I still have a large question in my own personal thinking that the proposed procudere is advisable. So, the report has not official status yet in the Corps of Engineers.

General PICK. You see, Mr. Donnelly, that project is about as complicated a project as you can think of anywhere in the world. None has ever been built like it anywhere.

You have terrific precipitation to take care of there, and slow run-off, and then you have terrific wind problems, and you have flat country where there is no fall to get the water out, and you have local problems down there. Each area has problems of its own, and each area is fearful that something will be done in another area which will cause them concern or even damage.

That project is being worked very slowly, it is being studied. I have spent a lot of time on it myself. It is something that has got to go slow; you have to work it out because there are so many angles in it.

Now, then, there will be study after study made as to what to do, and we have got a consultant board on that. There was a meeting of the board down there and that study was made for that meeting, was it not?

Mr. SLICHTER. That is correct.

General PICK. So, that has not been approved yet. It may be correct, sir. We may come up next year and tell the committee that is what we have decided.

Mr. DONNELLY. General, I ask you these questions to furnish a background for a suggestion. I have discussed with your representatives whether it would be advisable for the Corps of Engineers to circulate the district and division offices in the spring each year, shortly before the time you come before this committee, to get the latest figures so that this committee will be given current data rather than data which is 7 or 8 months old. What would you think of an arrangement such as that, sir?

General PICK. Well, we get those, we get those annual estimates changed in time to make up the data sheets—they are made up in the data sheets. You want them as of a certain date in the spring of each year?

Mr. DONNELLY. Shortly before your representatives come before the committee so that this committee will have current and reasonably accurate information.

General PICK. Well, we try to bring them up to date to show the increase in price, the increased cost due to price rises.

It seems to me that once a year to bring up the estimates on these jobs would be sufficient. I am thinking about the cost in it. If the committee wanted that we could do that; we could bring them up as of, say, the 1st of January each year, or just before they started hearings.

Failure to Disclose True Facts to Congress

Mr. Donnelly. We found one instance of an apparent desire on the part of your field offices to suppress the true facts from this committee and the Appropriations Committee of the Senate, and I only cite this as an illustration to demonstrate that about which we are talking. On the McNary dam there was a telephone conversation held in 1945 between the Portland district office and the Office of the Chief of Engineers in Washington. The district office pointed out that housing for workers on the $49,000,000 project would cost $7,000,000, and the two offices expressed great concern as to what congressional reaction would be to this situation and, apparently, it was decided to suppress the true facts until the following year. The representative in the Office of the Chief of Engineers said this: "Now, if we throw the answer of $7,000,000 (for housing) at them (a committee of Congress) and have a $49,000,000 project, somebody is going to fall dead." The people who were talking were a representative of your office and a representative of the Portland District office who decided they better wait until the following year perhaps before they told the Congress about that situation. I only refer to that, General, to illustrate the desirability, or the benefit that would flow from carrying out this suggestion.

General Pick. I think he was right. I said the same thing myself yesterday. I was approached on an Army post to build a set of quarters for $60,000. I said, "If I go before a committee of Congress and ask them for $60,000 to build a house on this post I expect the roof of the Capitol to raise up over my head," and it would, just as soon as I would go in there to try to get $60,000, because it is absurd.

Now, then, this was a telephone conversation. I do not go around and read people's telephone conversations, or their private memorandums, and people say things in telephone conversations that would not look so good in print. I would not doubt but what that came from a telephone conversation, but if it did the fellow on this end of the line was trying to tell the fellow out there that, for the Lord's sake, you cannot put that much money in that particular item or work.

Mr. Donnelly. Yes; but that is not the way it went. The conversation was that they knew the housing was going to cost $7,000,000, but they did not want to tell Congress, because Congress would, as they said, "Fall dead."

General Pick. All right; when I came back from overseas I had a job or a project where the housing was calculated to cost $8,000,000, and then $11,000,000. I said, "No; Congress would never agree to that," and I proceeded to cut it down. Now you probably know whether the housing costs $7,000,000 or not. Do you know whether the housing will cost $7 million or not?

Mr. Donnelly. No, I do not.

General Pick. I do not, either.

Mr. Donnelly. I cite that only as an illustration for a disposition not to give all the facts.

General Pick. Those were two of them.

Mr. Donnelly. Yes.

General Pick. As Chief of Engineers, I do not withhold information from a committee of Congress.

Mr. FORD. Mr. Chairman, I think it might be well perhaps to have the whole story in the record, to know whether the $7 million was actually requested and approved for this particular item.

Mr. DONNELLY. We just have some telephone conversations which the Corps of Engineers has given to us. I do not know whether the $7 million was ever reported to the committee or not.

Mr. FORD. Do you not feel, Mr. Donnelly, that to make the story complete we should have that as a part of the record?

Mr. DONNELLY. Will you ask someone to get that, General Pick?

General PICK. Yes; we can get the figure.

Mr. DONNELLY. Will you have it put in the record at this point?

General PICK. We will be glad to.

(The data requested follows:)

Housing, camp, and administrative facilities, both temporary and permanent, and including roads, utilities, etc., were approved in the definite-project report at a total cost of $7,414,000, for construction. (The authorization estimate for the whole project was $49,470,000.) Salvage value and rentals will reduce the cost to a total net amount of $3,504,000. As of June 30, 1951, the housing program has cost $5,370,000.

NONAVAILABILITY OF DEFINITE-PROJECT REPORTS IN OFFICE OF CHIEF OF ENGINEERS

Mr. DONNELLY. Now with respect to the definite project report; the definite-project report, generally speaking, is not available in your Office here in Washington, is it?

General PICK. I beg your pardon?

Mr. DONNELLY. The definite-project reports, generally speaking, are not available at your Office here in Washington, are they?

General PICK. When they are made up, they are made up in the field, they are either approved in the field, or they are approved in my office. Now in order to expedite the work, in order to cut down the administration costs to the minimum, I have people from the Engineering Division in my Office visit the district offices with a view to following the preparation of the definite-project studies to completion, so they may get tentative approval right out in the field without having to come to Washington.

Mr. DONNELLY. Once this definite-project report is completed, under orders and regulations there can be no major deviation from it without your approval; is that correct?

General PICK. That is correct.

Mr. DONNELLY. For the 182 projects in the current construction program, is it not a fact that very, very few of the definite-project reports for those projects are available in your office here in Washington?

General PICK. That is right. We only get them, only get them when they are sent in when they have been completed.

There is a running record kept of all actions taken with respect to the individual definite-project reports. There will be telegrams and letters and studies back and forth. Then when that definite-project report is completed, a copy of it is sent to my office.

Mr. DONNELLY. I have been down there a lot of times, that is, to the Washington Office, and your office has advised me that they are not there.

General PICK. Because they are working papers for a going job.

Mr. BEARD. Once we get the final copy——

General PICK. You are talking about getting a copy of them? It costs money to prepare them.

Mr. DONNELLY. No. I took a letter over to your Office, and requested that the definite-project report be made available, and they had, they said, only a file copy available.

Mr. BEARD. I do not think we understood that you wanted the file copy. What I thought you wanted was an extra copy, and all we have in Washington are our working copies.

General PICK. We do not have a copy until the project report is completed, and then we get a copy.

Mr. SLICHTER. We may have 10 copies of data sheets, but we only have one final copy—

Mr. DONNELLY. In any event, definite-project reports for many of the 182 projects under construction are not available because the reports had not been completed.

AVAILABILITY OF THE NEW PLANNING REPORT AS A CONGRESSIONAL DOCUMENT

Mr. DONNELLY. Now, if the new planning report were printed as a congressional document, would it not be available to Congressmen and Senators?

General PICK. It would be printed?

Mr. DONNELLY. It could be printed as a congressional document, just as the survey report is printed as a congressional document?

General PICK. The planning report that we prepare?

Mr. DONNELLY. That is right. I have indicated that the survey reports are printed. Do you not think the new planning report would deserve printing for the information of Congress? Do you have any views to express on that?

General PICK. I do not think it would be necessary. You mean in the hearings?

Mr. DONNELLY. No. When the Corps of Engineers has projects authorized on the basis of the survey report, then you get planning money from this committee for the purpose of closing the gap between the preliminary planning and in the survey report and the planning necessary to begin construction. This more advanced planning would be embodied in the planning report which you would submit to the Congress, through the Secretary of the Army. It would be printed as a document just as the survey report is printed. Do you have any comments to make on that?

General PICK. Yes. I would not like to see it, because in a project that is going to take 8 to 10 years to build, like we have got some now—we have some 8 or 10 of those reports printed and floating around—that would result in getting all kinds of erroneous information, giving us erroneous opinions. I would not like to see that done.

Mr. DONNELLY. I am not talking about 8 or 10 reports. I am talking about the survey report, which is now printed as a congressional document for the information of the Public Works Committee, and the planning report which would be printed as a congressional document for the information of the Appropriations Committee. Those are the two reports.

General PICK. Then you would have 160 of them printed this year.

Mr. DONNELLY. For each of the projects.

General PICK. Next year when we come up you would have another 160 or 180, including those that you had printed this year.

Mr. DONNELLY. Next year for each one of such planning reports that are printed there would be an addenda, which the Corps of Engineers could supply to this committee and to the Senate Committee on Appropriations, so that the committees would have a constant flow of facts on the planning performance, and the construction performance of the Corps of Engineers.

General PICK. I could not agree to that until I had had the time to make an estimate as to what it would cost. I would like to give the committee the benefit of the information, which I would be able to get, to show what it is going to cost. It is going to cost money. They have to go to the governors, and to the other Federal agencies and be coordinated before I could submit them to the committee here.

Mr. DONNELLY. General, that is not quite right——

General PICK. Oh, yes, it is.

Mr. DONNELLY. For every report?

General PICK. Oh, yes. Any change that is made in a project report has to go to the governors under the law, and has to be coordinated by other Federal agencies.

Mr. DONNELLY. General, since there are no reports now between the survey report and the time of beginning the construction of a project, from the time the survey report is referred to the Congress——

General PICK. Every report that you have asked about is being furnished.

Mr. CANNON. What was the answer?

General PICK. Everything the Congress has asked us for, all committees, is being furnished.

Mr. DONNELLY. Now with reference to the planning report: it would be filed by the Corps of Engineers and printed by the Congress as a document. This procedure could be adopted legislatively, and provision could be made in the statute requiring expedition of the preparation of the planning report.

General PICK. I think, Mr. Donnelly, you are asking me for an opinion before the committee. Of course my opinion on legislative matters is something else. I have no opinion. If the Congress decides it wants that, and makes it compulsory as a legislative matter, there is no question about it. I am not even supposed to think about it. I am going to do it if I am involved.

Mr. DONNELLY. Mr. Chairman, I would like to recess at your convenience. We have about another half hour of testimony with the engineer comptroller; but I leave that up to the committee.

Mr. KORTH. May I suggest, Mr. Chairman, that General Pick might be excused, if you do not want to ask him further questions. The reason I ask that is because he does have many preparations to make in connection with this trip. He has conferences with other staffs, and several meetings which I think are highly important, and if there are other questions to be asked of General Pick, I would like to suggest that they be asked now so that the committee might excuse him with the understanding, of course, that other witnesses will be available.

Mr. CANNON. Are there any further questions before we recess until 2:15?

Mr. DONNELLY. Mr. Chairman, I do want to ask General Pick one more question. I think all the rest of the testimony can be covered by the engineer comptroller.

Mr. CANNON. Then General Pick will be excused.

Mr. FORD. May I ask General Pick one or two questions?

Mr. CANNON. Yes.

Mr. FORD. It will take about 4 or 5 minutes.

Mr. CANNON. Very well, Mr. Ford.

PRESENT METHODS OF ESTIMATING BY THE BUREAU OF THE BUDGET

Mr. FORD. General Pick, it is my recollection that some few years ago a procedure was set up whereby the corps or any other agency in the executive branch of the Government would present its budget request to the Bureau of the Budget before presenting it to the Congress.

General PICK. Yes.

Mr. FORD. If I recall the legislation that was aimed at trying to make a better flow, a more coordinated presentation of the budget to the Congress.

General PICK. Yes.

Mr. FORD. Do you recall how many years the corps has been presenting its budget to the Bureau of the Budget prior to its submission to the Congress?

General PICK. It has been going on for a great many years.

Mr. KIMBEL. Around 30 years—since about 1922 when the Budget Act was passed.

General PICK. Since the Budget and Accounting Act was passed.

Mr. FORD. Do you know how many years, to your knowledge, the Corps of Engineers has been presenting its budget to the Bureau of the Budget prior to the submission by the Bureau of the Budget to the Congress?

General PICK. It would be before the time when I began to learn things in the Corps of Engineers.

Mr. FORD. Would anyone here be in position to know that?

General PICK. Mr. Kimbel says about 30 years.

Mr. KIMBEL. It has been going on since the Budget was established. That was created by statute, and I do not recall the exact time, but it was either 1920 or 1922.

Mr. FORD. In the years that the corps has been following this procedure submitting its budget initially to the Bureau of the Budget, has the Bureau of the Budget ever indicated to the corps that it wanted a final report that would differ from the survey report or the definite project report?

General PICK. Not to my knowledge. Judge Kimbel here has been there for many years, and he would know. I do not think it has.

Mr. FORD. I gather from your previous testimony this morning that the Bureau of the Budget has a hearing on budgets and develops information on all of these projects and on all of these data sheets.

General PICK. Yes.

Mr. FORD. Have these data sheets been materially changed in recent years?

General PICK. They have been changed. That came along after the 1936 Flood Control Act. The data sheets have been changed from time to time by adding additional information.

Mr. FORD. But the Bureau of the Budget has never requested anything comparable to a planning report at the time you submitted your request for appropriations?

General PICK. No. They take the data sheets; they have hearings generally just like the Appropriations Committees do.

Mr. FORD. It is my understanding that when the corps goes to the Bureau of the Budget they present their budget request and they are called upon for information, and the Budget has a corps of examiners, budget examiners?

General PICK. That is correct.

Mr. FORD. It is my understanding that when the Corps of Engineers' budget is before the Budget, the examiners there are to a large extent engineers?

General PICK. They are engineers, to a large extent engineers, but more than that, they inform themselves on the projects. They take frequent trips out to the field; they have people in the field in their field offices to cover the United States very thoroughly. For instance, the Denver office now has representatives covering the Missouri Basin, and they send in reports on these particular projects, so they have a good working knowledge of the individual projects.

Mr. FORD. In other words, their engineering reports on these numerous projects compiled by the engineers are subsequently checked and reexamined by the engineers in the Bureau of the Budget?

General PICK. That is correct.

Mr. FORD. Subsequently those recommendations go to the committees of Congress for approval or disapproval?

General PICK. Yes.

Mr. FORD. Do you know whether or not portions of the budget that come from the Department of the Interior supply similar data as that supplied by the Corps of Engineers to the budget, whether the data sheets are identical?

General PICK. Mr. Beard would know about that.

Mr. BEARD. The information in general is the same. The format of the data sheet is somewhat different, but the information is generally the same, yes.

Mr. FORD. In other words, the data sheet which the Bureau of Reclamation would present to the budget, and the data sheet which the Corps of Engineers would present to the budget would be practically identical?

Mr. BEARD. Yes, that is true, as to the information.

Mr. FORD. One final question: Are the forms which the Corps of Engineers present to the budget for presentation to the Congress approved by the Bureau of the Budget?

General PICK. I do not know whether the data-sheets idea came from the committee or whether it came from the budget. I know that every now and then either the committee or the budget will ask that something be added to the data sheets.

Mr. FORD. I have in my possession at the moment the justification sheet for the Defense Administration, and the justification sheets here are approved by the President. I am wondering whether or not the justification sheets that come from your department are likewise approved by him?

General PICK. No. There has been a working arrangement worked out with the committee and the Bureau of the Budget as to what

they want us to put in, and the form in which they want it, and the binder that they want, and the order in which they want them presented. There is not anything in the way of a legal requirement for it.

Mr. KIMBEL. May I just say this, that the green sheet is a prescribed form of the Bureau of the Budget, covering our estimates, and that the data sheet which has been discussed is something in addition to that.

NONCOMPLETION OF IMPORTANT PLANNING MANUAL STARTED 7 YEARS AGO

Mr. DONNELLY. If there is no objection, I want to ask something about the manual, the status of the Engineering Manual for Civil Works.

This manual is the guide for all offices of the Corps of Engineers in planning, and has been in the course of preparation for 7 years. Its status is shown in the following chart.

The committee members will see, from the chart that I have just handed to you, the status of that manual. If you will look at the subject on the left hand, you can see the general plans and reports which are in there; for example, river and harbor plans, and so on. And, even though the manual has been 7 years in the course of preparation, the important chapters prescribing planning criteria have just progressed beyond the first draft.

Now, the corps has indicated there is a limit of funds and personnel to do this very important thing. The orders and regulations of the corps refer repeatedly to the provisions of this manual, telling the districts and divisions what they must do, in accordance with the requirements of the manual. I want to invite the committee's attention to the need, the pressing need, for completion of this manual. This very important chapter on "Benefits" ties in with the analysis of a river-basin project, and reference is made to the manual's requirements in the corps' official instructions. Yet, the corps has not even written the first draft, and it is a very complex job. This is the chapter that deals with the cost-benefit ratio.

General PICK. That is correct, but you know the status of that, Mr. Donnelly. That has to be coordinated with all other governmental agencies; that was taken by the Cooke Commission on Water Resources, and they adopted most of it, and they have recommended some changes that are going through the throes and being studied again.

We have spent a tremendous amount of time on that particular one.

Mr. Chairman, this document here which Mr. Donnelly has just been talking about, the Engineering Manual for Civil Works, is a very important document, and we have got the first draft of that out. It is quite a job. We have concentrated on the most important items in the study. I would like to see it gotten out, just as soon as possible, but there is a ceiling on our personnel in the District of Columbia. During the war, and since the war, we have been so busy that we have not been able to put the right kind of people, in sufficient numbers, on this job to get it out. This has got to be done by people who are experts. I would like to see the job done just as quickly as possible; and, if the committee could help us in getting a little more personnel, we would be glad to do that.

Mr. DONNELLY. The manual is so important that the orders and regulations of the corps governing the planning and construction of projects refer to it constantly—for example, reference is made to 4214.07 where this is stated:

(a) *Engineers manual.*—Engineers Manual for Civil Works construction (in preparation), published by the Chief of Engineers, is the basic design guide for all civil works construction.

And throughout the orders and regulations we find, for example, this: section 4214.09, outlining the form of report:

(b) *Appendices.*—The appendices which supplement the main report will establish the basis of design by giving results of investigations and analyses, criteria proposed, and other pertinent data (approximately cross-referenced to the Engineering Manual for Civil Works) which form the basis for the over-all project design.

I have cited only two provisions of orders and regulations which direct the planning engineers to follow the manual.

And, I agree with General Pick's statement that the manual should be completed at the earliest time so that standard bases for preparation of designs and plans will be available to the some 37,000 Corps of Engineers' employees who have to do with planning and constructing these works.

I have nothing further at this time, Mr. Chairman.

Mr. CANNON. Thank you very much, General Pick.

General PICK. Thank you.

Mr. CANNON. The committee will resume its hearings at 2:15.

AFTERNOON SESSION

THURSDAY, AUGUST 9, 1951.

Mr. CANNON. The committee will come to order, and counsel will proceed.

Mr. DONNELLY. Mr. Chairman, may I ask Colonel des Islets to please state his full name?

WITNESS

COL. R. E. M. des ISLETS, ENGINEER COMPTROLLER

Colonel DES ISLETS. My name is R. E. M. des Islets, Corps of Engineers.

Mr. DONNELLY. What is your official position with the Corps of Engineers?

Colonel DES ISLETS. I am engineer comptroller.

HANDLING OF PUBLIC FUNDS BY THE CORPS OF ENGINEERS

Mr. DONNELLY. You are familiar, Colonel, with the recommendations of the committee's investigative staff having to do with the handling of public funds by the Corps of Engineers?

Colonel DES ISLETS. I am.

Mr. DONNELLY. Do you have any prepared statement you would like to read to the committee, based upon the recommendations?

Colonel DES ISLETS. I have a prepared statement, which I would like to put in the record. But in addition to that, I would like to add that we were already looking into this, about the same time the

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CI	GENERAL PLANNING AND REPORTS					← Copy of 1st. draft available at O.C.E.						
1	Introduction	ORD	Mar. 46									
2	Basic Laws and Authority	ORD	Mar. 46									
3	Procedure	ORD	Mar. 46									
4	Style and Format of Reports	ORD	Mar. 46									
CII	RIVER AND HARBOR PLANNING											
1	Preliminary Examination	ORD	Mar. 46									
2	Survey	ORD	Mar. 46									
3	Definite Project	ORD	Mar. 46									
CIII	FLOOD CONTROL PLANNING											
1	Preliminary Examination	ORD	Mar. 46									
2	Survey	ORD	Mar. 46									
3	Definite Project	ORD	Mar. 46									
CIV	RIVER AND HARBOR REPORTS											
1	Examination and Review	ORD	Mar. 46									
2	Survey and Review	ORD	Mar. 46									
CV	FLOOD CONTROL REPORTS											
1	Examination and Review	ORD	Mar. 46									
2	Survey and Review	ORD	Mar. 46									
CVI	DEFINITE PROJECT REPORT	ORD	Mar. 46									

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CVII	RECREATION REPORT	CRD	Mar. 46			← Copy of 1st. draft available at OCE.						
CVIII	BASIS OF DESIGN REPORT	ORD	Mar. 46									
CIX	INFORMATION PAMPHLETS											
CX	SURVEYS	LMVD	Oct. 45									
CXI	MAPS	LMVD	Oct. 45									
CXII	BENEFITS											
CXIII	COST ESTIMATES											
1	Reports Estimates	OCE	Oct. 46									
2	Government Estimate of Fair and Reasonable Cost to Contractor	OCE	Oct. 46									Final draft complete Field Distr 6/16/49
3	Government Estimate of Cost, Government Plant or Hired Labor Basis	OCE	Oct. 46									
CXIV	HYDROLOGIC & HYDRAULIC ANALYSIS											
1	Introduction	OCE	Jan. 46									
2	Reservoir Projects	OCE	Jan. 46									
3	Levee & Channel Improvements	MRD	May 46									

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CXIV	Continued					← Copy of 1st draft available at OCE.						
4	Storm Study Program Procedure	OCE	Jan. 46									
5	Flood Hydrograph Analyses and Computation	OCE	Dec. 47									2d Edition Compl. Field Distrib 6/26/
6	Reservoir Capacity and Outlet Requirements	OCE	Feb. 47									
7	Spillway Capacity and Freeboard Reqmts. for Dams	OCE	Jan. 46									
8	Routing of Floods Through River Channels	ORD	Feb. 46									
9	Computation of Backwater Curves in River Channels	OCE MRD	July 48 Feb. 46									Point Revised. Field Distr. 12/10/
10	Interior Drainage	OCE	Nov. 46									
CXV	SEDIMENTATION & DEBRIS INVESTIGATION	OCE	Jan. 48									
CXVI	HYDRAULIC DESIGN											
1	Special Flood Control Channels	MAD	Nov. 46									
2	Reservoir Outlet Structures	MRD	June 47									
3	Spillways	SWD	June 47									
4	Navigation Locks	UMVD	June 47									
5	Navigation Dams	UMVD	June 47									
6	Surges in Canals	MRD	June 46									Distr. 8/2/49
7	Tidal Hydraulics and Salt Water Problems	MAD USWES	June 46									
8	Waves and Wave Pressure	USWES	June 46									
CXVII	HYDRO POWER											
1	Introduction	OCE	June 46									
2	Determination of Power Capacity and Energy Output	OCE	June 46									

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8	Routing of Floods Through Open Channels	
9	Computation of Backwater Curves in Open Channels	
10	Interior Drainage	
CXV	REGULATION & CONTROL STRUCTURES	
CXVI	FLOOD CONTROL DESIGN	
1	Special Flood Control Charts	
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5	Hydraulic Data	
6	Dams in Canals	
7	Tidal Hydraulics and Salt Water Problems	
8	Weirs and Dam Measurements	
CXVII	FLOOD CONTROL	
1	Levees	
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CXVII	Continued				← Copy of 1st. draft available at O.C.E.							
3	Value & Cost of Hydro Power	OCE	June 46									
4	Summary	OCE	June 45									
CXVIII	SUBSURFACE INVESTIGATION											
1	Geological Investigations	OCE	July 47 Jan. 48									Being Revised Distr. Sept. 1948
2	Geophysical Explorations	OCE	Jan. 44									2d Edition Distr. Jan 1949
3	Soils Investigations	OCE	Jan. 44									Being Revised Distr. Oct. 1945
4	Availability of Local Construction Materials	SWD	Oct. 45									
CXIX	SOILS MECHANICS DESIGN											
1	Seepage Control	MRD	Apr. 46									
~~2~~	~~Current Meter Control~~	~~LMVD USWES~~	~~Apr. 46~~									
~~3~~	~~Stability of Foundations~~	~~MRD~~	~~Apr. 46~~									
‡2	Stability of Slopes and Foundations	LMVD USWES	Apr. 46									
‡3	Bearing Capacity of Foundations	MRD	Apr. 46									
‡4	Settlement Analysis	MRD	Apr. 46									
‡5	Earth Pressures	MRD	Apr. 46									
CXX	RECOMMENDED PRACTICE FOR CONCRETE AND REINFORCED CONCRETE	OCE	Nov. 46									Being Revised Distr. Aug. 1948
CXXI	STRESSES AND CRITERIA FOR STRUCTURAL DESIGN											
1	Working Stresses for Hydraulic Structures	OCE	Nov. 46									2d Edition Distrib. 2/23/48
2	Design Criteria											

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ENGINEERING MANUAL FOR CIVIL WORKS

Progress Posted to 1 July 1951

PART OR CHAPTER	SUBJECT	ASSIGNED TO	ASSIGNED DATE	OUT-LINE	1st. DRAFT PERCENTAGE COMPLETE 25 50 75	REVIEW TECHNICAL BRANCHES	2nd. DRAFT	REVIEW TECH. BR. OTHER DIV.	FINAL DRAFT	O.C.E. COM-MITTEE	PRINTED	REMARKS
CXXII	CONCRETE DAM DESIGN					← Copy of 1st. draft available at O.C.E.						Preparation of part by SPD cancelled 10/
1	General											-
2	Gravity Dams	ORD	Oct. 47									
3	Arch Dams											
4	Buttress Dams											
5	Special Type Dams											
CXXIII	EARTH DAM AND LEVEE DESIGN	NED NWD	Oct. 48									
CXXIV	SPILLWAYS AND OUTLET WORKS	SPD	Jan. 48									
CXXV	WALL DESIGN											
1	Flood Walls	OCE ORD	June 49 Oct. 48									Being Revised Distrib. 5/5/48
2	Retaining Walls	OCE	Jan. 48									Out of print Distr. Aug. 1945
CXXVI	NAVIGATION LOCK AND DAM DESIGN	NCVD	Oct. 48									
1	Locks											
2	Lock Masonry											
3	Lock Gates											
4	Lock Valves											
5	Emergency Closures for Locks											
6	Navigation Dams											
7	Navigation Dam Masonry											
8	Movable, Non-Navigable Dam Gates											
9	Movable Navigable Dam Closures											

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PART OR CHAPTER	SUBJECT	ASSIGNED TO	ASSIGNED DATE	OUT-LINE	1st. DRAFT PERCENTAGE COMPLETE (25 50 75)	REVIEW TECHNICAL BRANCHES	2nd. DRAFT	REVIEW TECH. BR. OTHER DIV.	FINAL DRAFT	O.C.E. COM-MITTEE	PRINTED	REMARKS
CXXVI	Continued					← Copy of 1st. draft available at O.C.E.						
10	Emergency Closures for Dams											
CXXVII	CREST & HEAD GATES											
1	General	OCE	Feb. 47									
2	Tainter Gates	OCE	Jan. 47									Being revised
3	Vertical Crest Gates	NPD	Oct. 45									
4	Drum Crest Gates	SPD	Aug. 45									
5	Roller Gates	MRD	Oct. 45									
CXXVIII	CONTROL GATES & VALVES FOR OUTLET WORKS											
1	General	OCE	Feb. 47									
2	Slide Gates	SPD	Oct. 45									
3	Tractor Gates	MRD	June 47									
4	Ring Follower Gates											
5	Ring Seal Gates											
6	Valves	ORD	Nov. 47									
CXXIX	DESIGN OF MISCELLANEOUS STRUCTURES											
1	Tunnel Timbering and Lining	ORD	Oct. 45									
2	Conduits, Culverts and Pipes	OCE	Nov. 49 Jan. 45									Being Revised Distrib. 10/14/48
3	Construction Housing	MCD	Mar. 47									
4	Breakwaters	NPD	Oct. 45									
5	Slope Protection	OCE	Jan. 47									
6	Piling	NCD	Apr. 48									

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PART OR CHAPTER	SUBJECT	ASSIGNED TO	ASSIGNED DATE	OUT-LINE	1st. DRAFT PERCENTAGE COMPLETE 25 50 75	REVIEW TECHNICAL BRANCHES	2nd. DRAFT	REVIEW TECH. BR. OTHER DIV.	FINAL DRAFT	O.C.E. COM-MITTEE	PRINTED	REMARKS
CXXX	HYDRO ELECTRIC POWER PLANTS				← Copy of 1st draft available at OCE							
1	General Requirements	ED	Apr. 46									Distrib. 6/11/48
2	Architectural Design	ED	Apr. 46									Distrib. 10/6/48
3	Structural Design	ED	Apr. 46									
4	Mechanical Design	ED	Apr. 46									
5	Electrical Design	ED	Apr. 46									
CXXXI	PUMPING STATIONS											
1	Introduction & General Considerations	OD	June 46									
2	General Principles of Design & Layout	OD	June 46									
3	Architectural Design	OD	June 46									Distrib. 3/29/48
4	Structural Design	OD	June 46									Distrib. 3/31/48
5	Mechanical & Electrical Design	OD	June 46									
CXXXII	ELECTRICAL AND MECHANICAL DESIGN											
1	Electrical Systems	EMD	Nov. 46									
2	Electrical Materials and Equipment	EMD	Nov. 46									
3	Mechanical Design	EMD	Nov. 46									
4	Accessory Equipment	EMD	Nov. 46									
5	Metals	EMD	Nov. 47									
CXXXIII	BEACH EROSION	BEB	June 46									Distrib. 11/7/47
CXXXIV	CONTRACT OPERATION PROCEDURES											
1	Assistance to Contractors											

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PART OR CHAPTER	SUBJECT	ASSIGNED TO	ASSIGNED DATE	OUT-LINE	1st. DRAFT PERCENTAGE COMPLETE 25 50 75	REVIEW TECHNICAL BRANCHES	2nd. DRAFT	REVIEW TECH. BR. OTHER DIV.	FINAL DRAFT	O.C.E. COM-MITTEE	PRINTED	REMARKS
CXXXIV	Continued					← Copy of 1st draft available at OCE.						
2	Change Orders											
3	Inspection											
CXXXV	FOUNDATION GROUTING	OCE	Aug. 47									Being revised
1	Planning											Distrib 2 Apr 50
2	Equipment											Distrib. 6/11/48
3	Field Technique and Inspection											
CXXXVI	RESERVOIR REGULATION	OCE	Jan. 48									Prelim. draft distrd as incl. to Engr. Bu No. 48-5
	Painting											

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committee investigators started their work. The Office of Chief of Engineers had under its consideration the making of changes within these fields at the time the recommendations in the committee staff report came out. When the report from the investigative staff did come out, as far as I am concerned, it merely galvanized me to take immediate steps, and I asked the Chief of Engineers himself to issue the necessary orders to the field to change the cost system.

May a copy of this be introduced in the record?

Mr. CANNON. It will be at this point.

(The statement is as follows:)

STATEMENT BY COL. R. E. M. DES ISLETS, CORPS OF ENGINEERS, RELATIVE TO ACTION TAKEN ON CERTAIN RECOMMENDATIONS OF SPECIAL INVESTIGATING STAFF, HOUSE COMMITTEE ON APPROPRIATIONS

Mr. Chairman, I would like to submit for the record a statement of action taken by the Chief of Engineers with reference to recommendations 20, 21, 24, and 25 contained in report of the special investigating staff of the House Committee on Appropriations.

Many of the items commented upon in the recommendations of the special investigating staff had previously received the consideration and attention of the Chief of Engineers. However, the specific recommendations of the staff indicated that additional procedural changes and instructions to the field organization were necessary for the improvement of operations. These actions were taken and are summarized below. It will be noted that the changes which have been made will result in simplified and more accurate and uniform cost-accounting procedures, and will also strengthen and improve the efficiency of the internal-audit program of the Corps of Engineers.

Recommendation No. 20.—The Corps of Engineers will continue to insist on the accurate reporting of construction costs. While it is to be expected that instances of cost inaccuracies will occur in large and complicated construction programs, every effort will be directed toward the detection and elimination of such inaccuracies. Any instances of "adjustments" or "transfers" made in the cost accounts in an attempt to keep costs within estimates or limitations will be covered in audit reports. It was indicated in the investigation report that an item requiring clarification was the method of prorating the costs of the civil works-engineering-investigation program and the Mississippi Basin model to the costs of the construction projects. This clarification has been issued, so that in the future the proration will be done on a uniform basis (par. 5, exhibit A, attached).

Recommendation No. 21.—It is believed that the cost-accounting procedures which have been issued are sufficiently comprehensive to assure that the military-construction program, the civil-works-construction program, the Veterans' Administration hospital-construction program, and any other programs performed by the Corps of Engineers will each be charged its proper share of all costs incurred. The major cause that could possibly have contributed to the absorption in some instances of military construction costs into the costs of civil works was eliminated on May 17, 1951, at which time the 9 percent limitation on Government costs (overhead, design, inspection, supervision, etc.) for military construction was removed (exhibit B, attached).

Recommendation No. 24.—The following action has been taken toward simplification and improvement of the cost-accounting system:

(*a*) The three separate cost distributions for the major organizational elements of district and division offices have been consolidated into a single cost distribution, thereby saving over half the work involved in the distribution of this indirect cost and also simplifying the basic cost computations and cost records (exhibit C, attached).

(*b*) Directed district engineers to make a detailed survey of the cost-account structure maintained for the purpose of eliminating all account subdivisions not absolutely essential, the record of the survey to be reviewed on the next audit by the Office of the Chief of Engineers or the division office. Also established the policy that thereafter the adequacy of the detailed account structure maintained by the district engineers will be a matter for review by the referred-to auditors on a regular continuing basis (par. 2, exhibit A, attached).

(*c*) Issued instructions for the purpose of discontinuing any unnecessarily fine cost analyses of labor charges. Under the new instructions district office personnel will no longer be permitted to analyze labor on the basis of insignificant contributions of time, such as fractions of an hour. For example, no time of district office engineers, draftsmen, etc., amounting to less than one-half day (4 hours) will be charged directly to feature of work accounts, thus obviating the necessity of recording labor on too detailed a basis (par. 4, exhibit A, attached).

(*d*) Issued instructions clarifying the intent of existing procedure that will eliminate complicated computations and detailed analyses of various types of district office expenses such as heat, light, power, telegrams, telephone, general office supplies, etc. For example, under these procedures, telephone bills, consisting of many small charges, will not be analyzed in detail; the amount of the bill will be considered as a general charge for inclusion as a portion of office overhead (par. 3, exhibit A, attached).

Recommendation No. 25.—The internal-audit program of the Corps of Engineers is being considerably strengthened by (*a*) increasing the scope of audit; (*b*) increasing the qualification standards of auditors; (*c*) increasing the responsibility for direct supervision of the auditors' performance; (*d*) increasing the Office of the Chief of Engineers audit staff to permit selective detail audits by OCE personnel, to insure proper coverage is being given by division auditors; and (*e*) by increasing the audit staff of division officers to permit rotating division auditors. The suggestion to centralize all internal audits in Office of the Chief of Engineers has been given serious consideration and is not considered practical for the following specific reasons: (*a*) Personnel ceilings will not permit it; (*b*) the rates of pay for OCE auditors would not be sufficiently attractive for the present field auditors to consider transferring to Washington; (*c*) considerably more expensive due to additional travel than the present organization structure; and (*d*) not sufficient utilization of audit personnel since an auditor cannot be expected to stay in travel status indefinitely.

The new internal-audit program has been developed along the lines recommended by the Army Audit Agency during the survey of the audit program of the Corps of Engineers. All recommendations contained in the report by the Army Audit have been incorporated in the new manual. These recommendations have not only been concurred in by the Chief of Engineers but have also been concurred in by the Office of the Comptroller of the Army who has recommended approval thereof by the Assistant Secretary of the Army.

(EXHIBIT A)

DEPARTMENT OF THE ARMY,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, D. C., June 22, 1951.

ENGCO and ENGCR 121.6.
Subject: Cost and Finance Accounting Procedures.
To: Division Engineers.
District Engineers.
Supervisor of New York Harbor.
Director, Waterways Experiment Station.

1. *Purpose.*—The accounting instructions contained herein are designed to obtain greater uniformity and simplification in existing procedures. While these objectives have been the subject of continuous concern to the Chief of Engineers, the need for consideration of the specific points covered herein has been emphasized by the recent congressional investigation of civil-works activities of the Corps of Engineers.

2. *Project Cost Account Structure.*—The subdivision of project cost accounts, as stated in Paragraph 35 of Chapter I of the Cost Accounting Manual, Civil Activities, is as follows:

(*a*) Projects are subdivided into features.
(*b*) Features are subdivided into subfeatures.
(*c*) Subfeatures may be further subdivided into sub-subfeatures, etc.

Subparagraph d of multiple letter ENGFC 121.6, October 7, 1949, Subject: "Changes in Cost Accounting Procedures—Civil Works Activities and VA Hospital Construction," stated that there would be no change with reference to maintenance of prescribed subfeature accounts, but that it was desired that District Engineers study the entire cost-account structure maintained for the

purpose of eliminating any accounts which they consider to be nonessential and which are not prescribed by regulations. It is mandatory that subdivisions of accounts be eliminated where not absolutely essential. For this purpose District Engineers will make a detailed survey of the account structure maintained for every civil works (including VA) project under their jurisdiction, and every account subdivision not prescribed by the Chief of Engineers which is considered to be nonessential will be eliminated. There should be a real need for *every* breakdown, of course, but particular attention should be paid to subdivisions below the level of *subfeatures*. The survey of the District Engineers should be completed as soon as practicable but not later than July 31, 1951. A record of the survey should be maintained which will briefly indicate justification for retention of existing accounts established by the District Engineer below the level of subfeature and which will also indicate the accounts eliminated. This record will be held available for review on the first audit or inspection by Office of the Chief of Engineers or Division Auditors occuring after completion of the District Engineer's survey. Thereafter the adequacy of project account structure will be a matter for review by the referred-to auditors within the general governing procedures contained in the Corps of Engineers Audit Manual.

3. *General District Office Expenses.*—The intent of the instructions contained in paragraph 5 of multiple letter ENGCO 121.6, July 19, 1950, Subject: "Changes in Cost Accounting Procedures—Civil Works Activities and VA Hospital Construction" was to indicate methods by which costing of division and district office expenses could be simplified. The purpose of charging division and district office costs of a general nature such as heat, light, power, telegrams, telephone and teletype rentals and toll charges, depreciation of general office equipment, general offices supplies, etc., to Account 20, General, is to eliminate to the most practicable extent complicated computations and detailed analysis of invoices and receiving reports. It is the intent of these instructions that all such costs incurred in the division and district office proper, referred to in the preceding sentence, will be considered as costs of a general nature to be charged to Account 20, for subsequent distributions to the division and district office functional cost classifications on dollar and/or other equitable bases. Telephone, teletype, and telegraph charges are for inclusion as general charges, in order to save the continuous detailed analysis of the many small charges involved in the services received. "General Office Supplies" was defined in the above-referred-to paragraph 5. These instructions are also applicable to military cost accounting (Account 50) and the provisions of Circular Letter No. 4433 (Fiscal No. 445), July 1, 1948, Subject: "Cost Accounting—Division and District Office Expense, etc.—Military and Civil Works," are modified accordingly.

4. *Labor Charges.*—(*a*) *Division and District Office Engineering, Operations, and Real Estate Functions.*—It is provided in paragraph 76.a (7) of Chapter I, Cost Accounting Manual, Civil Activities, in respect to the operation of the district office "General Engineering and Operations Expense Account," that costs will be charged directly to specific features of work whenever practicable. For this purpose, commencing no later than July 1, 1951, no time of district office engineers, draftsmen, and others of less than one-half day (four hours) will be charged directly to feature accounts, etc. Paragraph 76.a (10) of Chapter I of the Cost Accounting Manual, relative to "Real Estate Expense" is changed to apply a similar four-hour limitation thereto for district office personnel. The one-day limitation for division-office engineering, operations, and real-estate personnel, contained in the referred to paragraphs 76.a (7) and (10), remains unchanged. These instructions are also applicable to military cost accounting, and the provisions of Circular Letter No. 4433 (Fiscal No. 445), July 1, 1948, Subject: "Cost Accounting—Division and District Office Expense, etc.—Military and Civil Works," are modified accordingly. The instructions in the following subparagraph relative to charges in multiples of one hour are equally applicable to this subparagraph, subject to the above four-hour limitation.

(*b*) *District Field Employees.*—In the case of such employees, labor charges will be made in multiple of full hours only. That is, charges for working time will be rounded off to the nearest whole hour, but care will be exercised to account for neither more nor less than the whole working period. This determination implies that no separate charges will be made for insignificant contributions of time which amount to less than half an hour per working day and that such minor contributions of time will be absorbed by charges to activities whose time is raised to the nearest full hour. These instructions are applicable to both military and civil activities.

5. *Cost of Mississippi Basin Model and of Civil Works Investigations program.*—(*a*) Such costs billed to districts will be prorated to civil works projects on the basis of the total construction funds (Major Capital Outlay less planning funds) allotted for the appropriate projects, after the appropriation act has passed and funds for the year have been allotted.

(*b*) Bills to districts from the Chief of Engineers for the Civil Works Investigations Program will indicate the amount to be charged to each appropriation, and distribution to projects under those appropriations will be made on the basis indicated in subparagraph (*a*), above. Bills to districts for Mississippi Basin Model expense will be distributed to both FC-General and FC-MR&T projects, also on the basis indicated in subparagraph (*a*), above.

(*c*) The costs will be charged to the cost account for Special Investigations and Consultants, under Construction Engineering and Design (Preliminary Work). For types of projects where the referred to account is not maintained the Mississippi Basin Model costs and Civil Works Investigations Program costs will be charged to separate accounts under the appropriate projects.

6. *Land Acquisition.*—In some cases obligations are being recorded against allotted funds on the basis of civil works land acquisition programs or other informal estimates prior to obtaining options or instituting condemnation proceedings. Such action results in overstatement of obligations in accounts and reports and must be discontinued at once. The provisions of paragraph 5.0.(2) of the District Finance Accounting Manual must be observed in all instances with respect to recording obligations for civil works land acquisition.

By order of the Chief of Engineers:

CRAIG SMYSER,
Lt. Col., Corps of Engineers, Executive.

EXHIBIT B

DEPARTMENT OF THE ARMY,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington 25, D. C., 17 May 1951.

ENGCM 600.1

Subject: Revocation of 9% Limit on Government Costs for Military Construction
To: Division Engineers
District Engineers

1. Effective immediately the 9% limitation on government costs for military construction is revoked. This does not apply, however, to the following referenced limitation which were established by levels higher than the Office of the Chief of Engineers:

(*a*) Limitations on construction with nonappropriated funds, WD Memorandum 210–50–2 dated 21 April 1947.

(*b*) Limitations on Air National Guard construction (see multiple letter Engmg 600.1, 18 October 1948, subject: "Air National Guard Construction Projects—Government Costs and Contingencies").

2. Removal of this limitation recognizes the need for constant control of costs on an individual job basis instead of control through adherence to an abritrary standard. Operating without this limitation will require strengthening of the many cost control actions which are being taken to reduce and keep government costs at the lowest possible level. Further reduction of costs through more extensive use of job cost controls demands continued close attention to the proper distribution of all appropriate costs to ensure that they are charged to the job for which they were incurred and timely action is taken to keep actual costs within the approved job estimate or budget.

By order of the Chief of Engineers:

CRAIG SMYSER,
Lt. Col., Corps of Engineers, Executive.

EXHIBIT C

DEPARTMENT OF THE ARMY,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington 25, D. C., 28 June 1951.

ENGCO 121.6

Subject: Cost Accounting—Division and District Office Expense—Military and Civil Activities (Including VA Construction)
To: Division Engineers
District Engineers

1. In order to simplify cost accounting procedures, effective 1 July 1951 the present cost accounts for Division and District Overhead, General Engineering & Operations Expense, and Real Estate Expense, will be consolidated into one new account entitled "Division and District General Overhead." Separate accounts will be maintained for civil and military work as heretofore. The "Division and District General Overhead" account will be subdivided into the same functional subaccounts now maintained for the three discontinued accounts, as listed in paragraph 4 of multiple letter ENGCO 121.2, 13 July 1950, subject: "Cost Budgeting—Civil and Military Works," except that only one subaccount to absorb the portion billed by the division office will be maintained by each district.

2. Predetermined "Division and District General Overhead" rates will be computed in the manner prescribed for Division and District Overhead in paragraph 80 of Chapter I, Cost Accounting Manual (Civil Activities) and in paragraph 4b of Circular Letter No. 4433 (Fiscal No. 445), 1 July 1948, subject: "Cost Accounting—Division and District Office Expense, etc.—Military and Civil Works." Any balances in the discontinued accounts as of 30 June 1951 will be transferred to the "Division and District General Overhead" account.

3. The new account will be reported on the project cost summaries for the Plant Allotment (or equivalent, for Civil Works) and for District Office Expense (Military) in the same manner as the superseded Division and District Office Overhead account. Normal approved procedures will be followed in respect to making charges direct to features of work, etc. Reporting of division and district office expenses on ENG Form 1839 will continue as required by paragraph 7 of the multiple letter referred to in paragraph 1 above.

4. The indirect cost items A. 1. d. (1), (3), and (4) in cost breakdown (Inclosure to multiple letter ENGCO 121.6, 12 April 1950; subject: "Cost Analysis—R&H anf FC Works" as changed by multiple letter of the same symbol and subject, dated 28 April 1950) will be consolidated and reported as item A. 1. d. (4), "Division and District General Overhead." The titles of Account 804 (Chart of Accounts attached to multiple letter, ENGCO and ENGMT 121.6, 13 April 1951, subject: "Cost Accounting and Cost and Progress Reporting for Military Construction and Other Activities.") and of Account 807 (Chart of Accounts attached to Circular Letter No. 4375, (Fiscal No. 433) (Military Construction No. 81), 3 September 1947, subject: "Cost Accounting" "Veterans Administration Hospital Construction Program") are changed to "Division and District General Overhead." For all military construction jobs reported under "Current Work" on Cost Form 39A, the costs of the discontinued accounts previously charged to inspection and supervision, engineering, etc., will be transferred therefrom and included in Account 804. Similar adjustments will be made in civil works accounts, VA accounts, and others to the necessary extent so that the new account will be inclusive of all appropriate costs.

5. It is intended that the cost reporting instructions contained herein will be applicable to cost reports submitted for periods subsequent to June 1951. No change is desired in the reports for June 1951.

By order of the Chief of Engineers:

CRAIG SMYSER,
Lt. Col., Corps of Engineers, Executive.

Colonel DES ISLETS. We have also issued the necessary orders in order to prevent any further happenings of this type.

Mr. DONNELLY. Colonel, let me read to you recommendation No. 20:

> The Corps of Engineers should encourage the accurate reporting of construction costs by the various district offices.

Mr. Chairman, these are recommendations of the committee staff that deal with the handling of public funds, and the engineer comptroller is testifying with respect to the recommendations.

Let me read for the record the four recommendations dealing with the procedure for handling public funds.

Recommendation No. 20:

> The Corps of Engineers should encourage accurate reporting of construction costs by the various district offices.

Would you like to make any comment on that recommendation?

Colonel DES ISLETS. Recommendation No. 20. The Corps of Engineers will continue to insist on the accurate reporting of construction costs. While it is to be expected that instances of cost inaccuracies will occur in large and complicated construction programs, every effort will be directed toward the detection and elimination of such inaccuracies. Any instances of adjustments or transfers made in the cost accounts in an attempt to keep costs within estimates or limitations will be covered in audit reports.

It was indicated in the investigation report that an item requiring clarification was the method of prorating the cost of the civil-works engineering investigations program, and the Mississippi Basin model to the costs of the construction projects. This clarification has been issued so that in the future the proration will be done on a uniform basis.

And in that connection I would like to offer this document dated June 22, 1951, an order issued at my instigation, by the executive officer of the Chief of Engineers, paragraph 5.

Mr. DONNELLY. Now, Colonel, with the assent of the committee that document has already been placed in the record, and is entitled "Cost and financing accounting procedures." It was exhibit A to your formal statement.

Colonel DES ISLETS. It puts together several other procedures that we felt should be followed at the same time.

Mr. DONNELLY. Then exhibit A is necessary to implement recommendation No. 20 of the committee staff, specifically covering the method of reporting on construction costs, contained in the directive of June 22, 1951.

Colonel DES ISLETS. Yes.

Mr. KERR. Do you want to read the directive, read all of this paragraph?

Colonel DES ISLETS. The paragraph I want to read is this statement:

COST OF MISSISSIPPI BASIN MODEL AND OF CIVIL WORKS INVESTIGATIONS PROGRAM

(*a*) Such costs billed to districts will be prorated to civil-works projects on the basis of the total construction funds (major capital outlay less planning funds) allotted for the appropriate projects, after the Appropriation Act has passed and funds for the years have been allocated.

(*b*) Bills to districts from the Chief of Engineers for the civil-works-investigations program will indicate the amount to be charged to each appropriation, and distribution to projects under those appropriations will be made on the basis indicated in subparagraph (*a*), above. Bills to districts for Mississippi Basin model expense will be distributed to both FC-general and FC-MR&T projects, also on the basis indicated in subparagraph (*a*) above.

(*c*) The costs will be charged to the cost account for special investigations and consultants, under construction engineering and design (preliminary work). For types of projects where the referred-to account is not maintained, the Mississippi Basin model costs and civil-works investigation-program costs will be charged to separate accounts under the appropriate projects.

Mr. DONNELLY. That is the end of paragraph 5. Now, Colonel, let me invite your attention to recommendation No. 21 of the committee staff:

Strict rules should be adopted by the Corps of Engineers to assure that costs pertaining to military construction, construction for the Veterans' Administration, and to other civil-works-construction programs, will not be charged either directly or indirectly to the civil-works program.

Have you any comments to make on that recommendation?

Colonel DES ISLETS. Yes. My reply is that I believe that the cost-accounting procedures which have been issued are sufficiently comprehensive to assure that the military construction program, the civil works construction program, the Veterans' Administration Hospital construction program, and any other programs performed by the Corps of Engineers will each be charged its proper share of all costs incurred. The major cause that could possibly have contributed to the absorption in some instances of military construction costs into the costs of civil works, was eliminated on May 17, 1950, at which time the 9-percent limitation on Government costs, which was overhead, design, inspection, supervision, and so forth, for military construction was removed.

On that date we issued an order entitled "Revocation of 9 percent limit on Government costs for military construction" and made it effective immediately.

Effective immediately the 9-percent limitation on Government costs for military construction is revoked. This does not apply, however, to the following referenced limitations which were established by levels higher than the Office of the Chief of Engineers:

(*a*) Limitations on construction with nonappropriated funds, WD Memorandum 210–50–2 dated April 21, 1947.

(*b*) Limitations on Air National Guard construction * * *.

Removal of this limitation recognizes the need for constant control of costs of an individual-job basis instead of control through adherence to an arbitrary standard. Operating without this limitation will require strengthening of the many cost-control actions which are being taken to reduce and keep Government

costs at the lowest possible level. Further reduction of costs through more extensive use of job-cost controls demands continued close attention to the proper distribution of all appropriate costs to insure that they are charged to the job for which they were incurred and timely action is taken to keep actual costs within the approved job estimate or budget.

Mr. KORTH. That was dated May 17, 1950?

Colonel DES ISLETS. May 17, 1950.

Mr. DONNELLY. All right, sir. Now, with respect to recommendation No. 24 of the committee staff:

Simplified-accounting system should be adopted by the Corps of Engineers.

Would you give the committee your comments on that recommendation?

Colonel DES ISLETS. The following action has been taken toward simplification and improvement of the cost-accounting system:

The three separate cost distributions for the major organizational elements of district and division offices have been consolidated into a single-cost distribution, thereby saving over half the work involved in the distribution of this indirect cost and also simplifying the basic-cost computations and cost records.

We have here to back up our improvement, this red-bordered paper dated June 28, 1951, entitled "Cost accounting—Division and district office expense—Military and civil activities (including VA construction)", which is exhibit C to my formal statement.

Mr. DONNELLY. This paper of June 28, 1951, which is entitled "Cost accounting—Division and district office expense—Military and civil activities (including VA construction)" you issued to implement the recommendation made by the committee staff; did you not?

Colonel DES ISLETS. That is right.

Mr. DONNELLY. This was under date of June 28, 1951?

Colonel DES ISLETS. 1951; that is right. Would you like that read? It is rather long.

Mr. DONNELLY. That is long. It is already in the record, unless someone wants to hear it read.

Colonel DES ISLETS. We directed district engineers to make a detailed survey of the cost-account structure maintained for the purpose of eliminating all account subdivisions not absolutely essential, the record of the survey to be reviewed on the next audit by the Office of the Chief of Engineers or the division office. We also established the policy that thereafter the adequacy of the detailed account structure maintained by the district engineers will be a matter for review by the referred-to auditors on a regular continuing basis.

Now this is part of the first paper, exhibit A, that I read to you.

2. Project Cost Account Structure—The subdivision of project cost accounts, as stated in paragraph 35 of chapter I of the Cost Accounting Manual, Civil Activities, is as follows:

(*a*) Projects are subdivided into features.

(*b*) Features are subdivided into subfeatures.

(*c*) Subfeatures may be further subdivided into sub-subfeatures, et cetera.

Subparagraph d of multiple ENGFC 121.6, October 7, 1949, Subject: Changes in cost-accounting procedures—civil-works activities and VA Hospital construction, stated that there would be no change with reference to maintenance of prescribed subfeature accounts, but that it was desired that district engineers study the entire cost-account structure maintained for the purpose of eliminating any accounts which they consider to be nonessential and which are not prescribed by regulations. It is mandatory that subdivisions of accounts be eliminated where

not absolutely essential. For this purpose district engineers will make a detailed survey of the account structure maintained for every civil works (including VA) project under their jurisdiction, and every account subdivision not prescribed by the Chief of Engineers which is considered to be nonessential will be eliminated. There should be a real need for every breakdown, of course, but particular attention should be paid to subdivisions below the level of subfeatures. The survey of the district engineers should be completed as soon as practicable but not later than July 31, 1951. A record of the survey should be maintained which will briefly indicate justification for retention of existing accounts established by the district engineer below the level of subfeature and which will also indicate the accounts eliminated. This record will be held available for review on the first audit or inspection by Office of the Chief of Engineers or division auditors occurring after completion of the district engineer's survey. Thereafter the adequacy of project account structure will be a matter for review by the referred-to auditors within the general governing procedures contained in the Corps of Engineers Audit Manual.

Mr. DONNELLY. Colonel, you have just been reading from the document dated June 22, 1951, entitled "Cost and Finance Accounting Procedures."

Colonel DES ISLETS. That is right.

Mr. DONNELLY. Do you have any comment to make on the cost-accounting analyses for labor charges, as to whether or not they should be simplified?

Colonel DES ISLETS. We issued instructions for the purpose of discontinuing any unnecessarily fine cost analyses of labor charges. Under the new instructions district office personnel will no longer be permitted to analyze labor on the basis of insignificant contributions of time, such as fractions of an hour. For example, no time of district office engineers, draftsmen, et cetera, amounting to less than one-half day, 4 hours, will be charged directly to feature of work accounts, thus obviating the necessity of recording labor on too detailed a basis.

That I can back up with the same order, dated June 22, 1951, paragraph 4, entitled "Labor Charges."

Mr. DONNELLY. Did you want to read that? You have paraphrased it in your comment.

Colonel DES ISLETS. I do not care to read it; no.

Mr. DONNELLY. The entire document is already in the record.

Colonel DES ISLETS. Yes.

We also issued instructions clarifying the intent of existing procedure that will eliminate complicated computations and detailed analyses of various types of district office expenses such as heat, light, power, telegrams, telephone, general office supplies, et cetera. For example, under these procedures telephone bills, consisting of many small charges, will not be analyzed in detail; the amount of the bill will be considered as a general charge for inclusion as a portion of office overhead.

Mr. DONNELLY. Colonel, the committee staff found cases where Congress had earmarked the money for specific projects, and toward the close of the fiscal year someone in the Corps of Engineers would deobligate the funds from that project and obligate them some place else, and then after the new fiscal year started they would deobligate the funds from the second project and put them back where they were in the first place.

Have you taken any steps, or do any steps exist, under your jurisdiction as engineer comptroller to guard against that sort of juggling of funds and accounts?

Colonel DES ISLETS. I would like to state first that we do not approve any of that. We unfortunately found it out about the same time you did.

In connection with that, we made our recommendation in paragraph 25, in which we changed our entire internal audit system.

The internal audit program of the Corps of Engineers is being considerably strengthened by (a) increasing the scope of audit, (b) increasing the qualification standards of auditors, (c) increasing the responsibility for direct supervision of the auditors' performance, (d) increasing the Office of the Chief of Engineers audit staff to permit selective detail audits by OCE personnel, to insure proper coverage is being given by division auditors, and (e) by increasing the audit staff of division offices to permit rotating division auditors, so that the same auditors do not always audit the same things and maybe get funny ideas.

The suggestion to centralize all internal audits in the Office of the Chief of Enginers has been given serious consideration and is not considered practical for the following specific reasons: (a) Personnel ceilings will not permit it; (b) the rates of pay for OCE auditors would not be sufficiently attractive for the present field auditors to consider transferring to Washington; (c) considerably more expensive due to additional travel than the present organization structure; and (d) not sufficient utilization of audit personnel, since an auditor cannot be expected to stay in travel status indefinitely.

This new internal-audit program has been developed along the lines recommended by the Army Audit Agency during the survey of the audit program of the Corps of Engineers. All recommendations contained in the report by the Army Audit have been incorporated in the new manual. These recommendations have not only been concurred in by the Chief of Engineers but have also been concurred in by the Office of the Comptroller of the Army, who has recommended approval thereof by the Assistant Secretary of the Army.

I understand informally it has been approved but recently and will be back up to us in a few days.

Mr. DONNELLY. Colonel, how long has the position of engineer comptroller been in existence?

Colonel DES ISLETS. It was set up in December of 1949.

Mr. DONNELLY. December of 1949. That is a little over a year and a half ago?

Colonel DES ISLETS. Just about a year and a half ago.

Mr. DONNELLY. Is your authority for supervising the handling of public funds commensurate with your responsibility in that respect?

Colonel DES ISLETS. Yes. I have complete authority for the chief.

Mr. DONNELLY. Is it not a fact, Colonel, that until the investigative staff of this committee looked into the Corps of Engineer operations that there was no audit being made of the corps' handling of public funds outside of the corps itself?

Colonel DES ISLETS. That is right.

Mr. DONNELLY. And as a result of the committee's work and as a result of your own taking the initiative in this matter arrangements

have now been made for continuing quarterly audits of the Corps of Engineers by the Department of the Army. Is that not right, sir?

Colonel DES ISLETS. Yes. Actually the Department of the Army has decentralized it again to us. We are still making it ourselves, but we have made it so much stronger and so much more independent that we are doing it as an independent agency, you might say.

Mr. DONNELLY. What role will the Army Audit Agency play in the picture?

Colonel DES ISLETS. They will make spot checks now and check to see that we are actually doing the new internal-audit program.

Mr. DONNELLY. I had understood in the conference in which you participated that in the view of Mr. Pearson, who was from the Office of the Assistant Secretary of the Army for General Management, that an external audit—that is, outside the Corps of Engineers—was desirable and necessary. With this new decentralized arrangement you speak of, will that external audit be made?

Colonel DES ISLETS. Yes. It will be made by the Army Audit Agency. As I say, it will be a spot check annually through our business to see that we are right on the money, to see that all the policy is taken care of, and that all the necessary checks have been made. I think it is a very strong new program and it is currently in effect. It has already been put into effect.

Mr. DONNELLY. Now, with respect to the recommendations of the committee staff dealing with outstanding inventories of surplus and obsolete material, what accounting check is there of such inventories?

Colonel DES ISLETS. Our division auditor will take care of that, as they make these quarterly audits, Mr. Donnelly. I believe they will make a complete check as they go around and have the surplus inventories right on the money with the rest of the inventories.

Mr. DONNELLY. Are you satisfied, Colonel des Islets, that with your present authority the Corps of Engineers will have the opportunity to guard against any juggling of civil functions funds from one account to the other, and so on?

Colonel DES ISLETS. It is my personal opinion; I do not think that this can happen again.

Mr. DONNELLY. You are fully aware of the need for the furnishing of current and sound information to this committee each year, are you not?

Colonel DES ISLETS. Surely.

Mr. DONNELLY. Do the committee members have any questions to ask of this officer? I have no further questions to ask of either this witness or any other, sir.

Mr. CANNON. Thank you, gentlemen.

Mr. KERR. Let me ask you one question. What do you mean by juggling, the Army engineers juggling money from one project to another?

Colonel DES ISLETS. He means obligating at the tail end of the year, to get the money expended, and then deobligating at the beginning of the year and putting it in another account. That will not be possible any more, sir, and as I stated before has never been approved as a policy in the Chief's office.

Mr. KERR. So far as you know, the use of the money was justifiable in every respect?

Colonel DES ISLETS. Absolutely, sir. There is no question about the use of the money. It is just a question of the irregular accounting procedure which should not have occurred. The reason it occurred was because we were a little too thin on our audit procedure. We will not do it again.

Mr. KERR. Thank you.

Mr. CANNON. Thank you, gentlemen.

Colonel DES ISLETS. Thank you, sir.

Mr. KORTH. Thank you, Mr. Chairman.

Mr. CANNON. That closes the hearing, gentlemen. We will ask counsel to prepare and submit to the committee a report.

I believe I express the opinion of all members of the committee when I say that we certainly thank Mr. Donnelly for the splendid work he has given us here. It has been remarkable both in the ability he has shown in handling the matter, and the courtesy he has maintained toward all witnesses. I think it is going to be productive of splendid results.

Mr. DONNELLY. Thank you, sir.

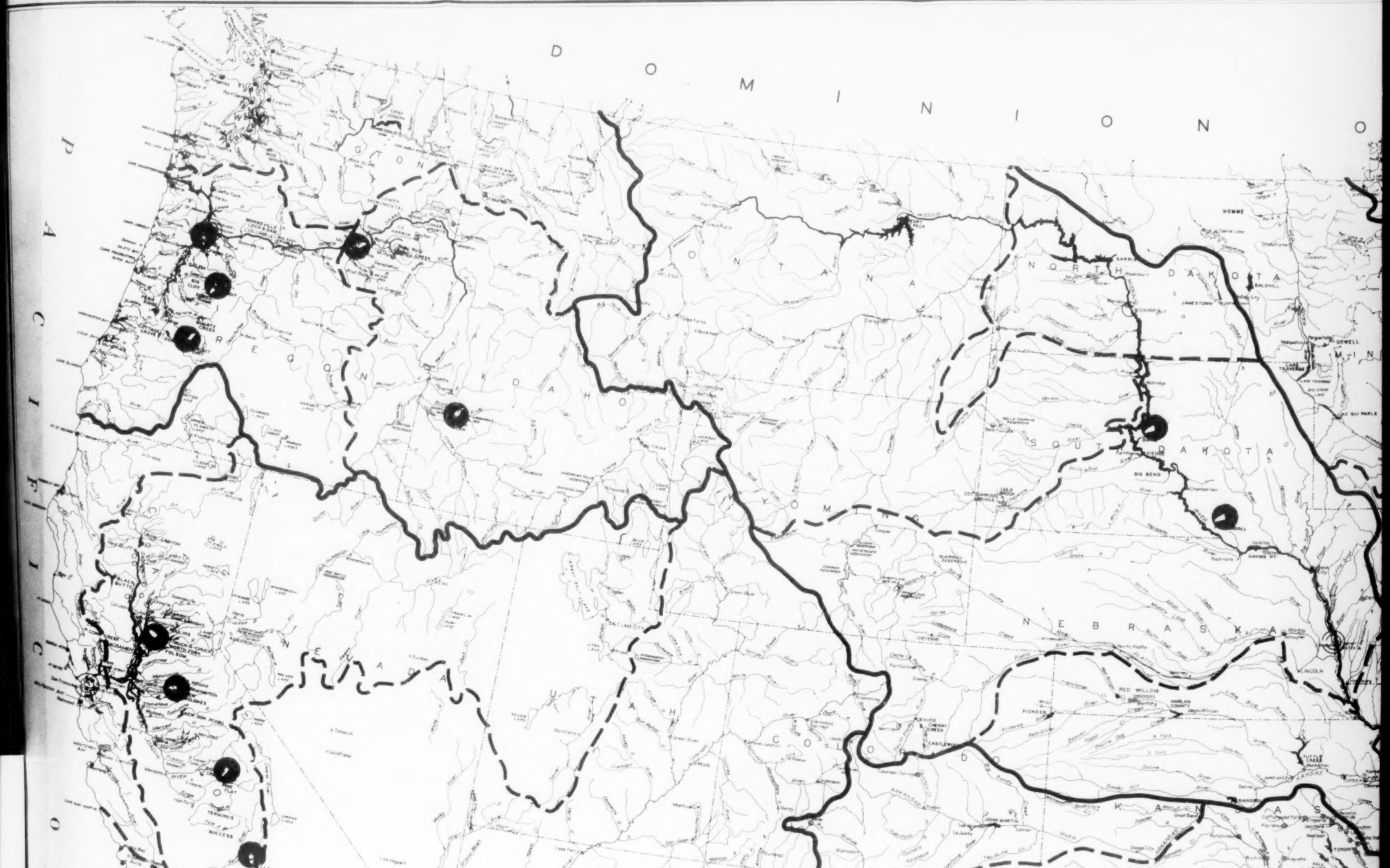
Mr. CANNON. We are very grateful to you, Mr. Donnelly.

Mr. DONNELLY. Thank you, sir.

REPORT OF COMMITTEE COUNSEL

ON

INVESTIGATION OF 182 PROJECTS, COMPRISING ENTIRE CIVIL WORKS CONSTRUCTION PROGRAM OF CORPS OF ENGINEERS FOR FISCAL YEAR 1951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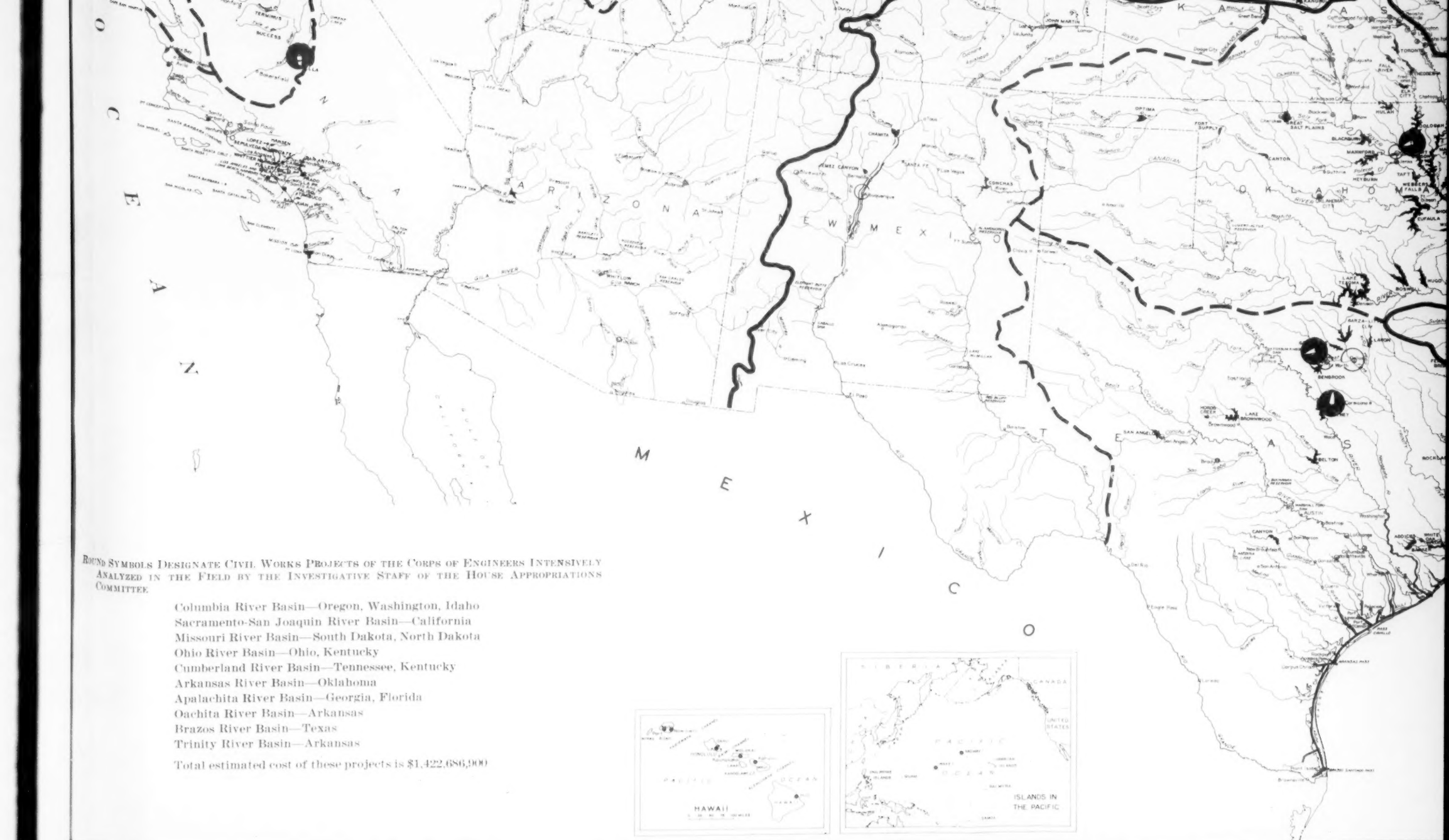

ROUND SYMBOLS DESIGNATE CIVIL WORKS PROJECTS OF THE CORPS OF ENGINEERS INTENSIVELY ANALYZED IN THE FIELD BY THE INVESTIGATIVE STAFF OF THE HOUSE APPROPRIATIONS COMMITTEE.

Columbia River Basin—Oregon, Washington, Idaho
Sacramento-San Joaquin River Basin—California
Missouri River Basin—South Dakota, North Dakota
Ohio River Basin—Ohio, Kentucky
Cumberland River Basin—Tennessee, Kentucky
Arkansas River Basin—Oklahoma
Apalachita River Basin—Georgia, Florida
Oachita River Basin—Arkansas
Brazos River Basin—Texas
Trinity River Basin—Arkansas

Total estimated cost of these projects is $1,422,686,900

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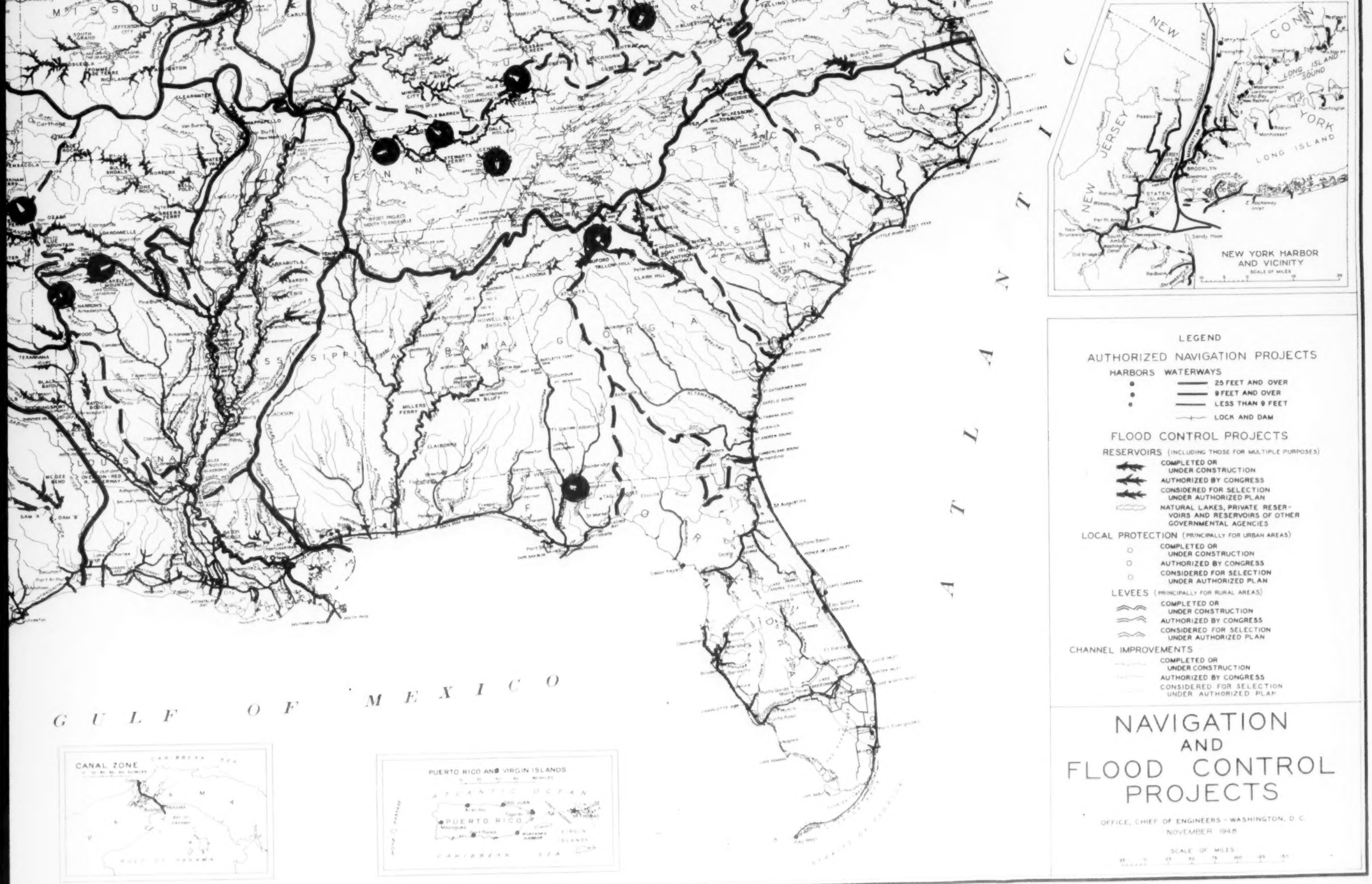
C A N A D A
F
LAKE SUPERIOR
LAKE ONTARIO
LAKE ERIE
M I C H I G A N
W I S C O N S I N
M I N N E S O T A
I L L I N O I S
I N D I A N A
O H I O
P E N N S Y L V A N I A
N E W Y O R K
M A I N E
M I S S O U R I
A T L A N T I C O C E A N
SEE INSET
NEW
CONN

FLOOD CONTROL RESERVOIRS IN NEW ENGLAND AREA

NO	NAME OF RESERVOIR	STATE	NO	NAME OF RESERVOIR	STATE
	CONNECTICUT RIVER BASIN			THAMES RIVER BASIN	
1	VICTORY	VT	21	ANDOVER	CONN
2	BALL MOUNTAIN (WEST RIVER)	VT	22	SOUTH COVENTRY	CONN
3	UNION VILLAGE	VT	23	MANSFIELD HOLLOW	CONN
4	SOUTH TUNBRIDGE	VT	24	EAST BRIMFIELD	MASS
5	GAYSVILLE	VT	25	WESTVILLE	MASS
6	NORTH HARTLAND	VT	26	BUFFUMVILLE	MASS
7	WEST CANAAN	N H	27	HODGES VILLAGE	MASS
8	CLAREMONT	N H		MERRIMACK RIVER BASIN	
9	NORTH SPRINGFIELD	VT			
10	LUDLOW	VT	28	WEST PETERBORO	N H
11	BROCKWAY	VT	30	BENNINGTON	N H
12	CAMBRIDGEPORT	VT	31	BLACKWATER	N H
13	TOWNSHEND (WEST RIVER)	VT	32	FRANKLIN FALLS	N H
14	SURRY MOUNTAIN	N H	33	BEARDS BROOK	N H
15	HONEY HILL	N H			
16	TULLY	MASS		BLACKSTONE RIVER BASIN	
17	BIRCH HILL	MASS	34	WEST HILL	MASS
18	BARRE FALLS	MASS			
19	WEST BROOKFIELD	MASS		HOUSATONIC RIVER BASIN	
20	KNIGHTVILLE	MASS	35	THOMASTON	CONN
EOA	SUGAR HILL	N H			
EOB	THE ISLAND	VT			


NEW YORK HARBOR AND VICINITY
SCALE OF MILES
CANAL ZONE
PUERTO RICO AND VIRGIN ISLANDS
LEGEND
AUTHORIZED NAVIGATION PROJECTS
HARBORS
WATERWAYS
25 FEET AND OVER
9 FEET AND OVER
LESS THAN 9 FEET
LOCK AND DAM
FLOOD CONTROL PROJECTS
RESERVOIRS (INCLUDING THOSE FOR MULTIPLE PURPOSES)
COMPLETED OR UNDER CONSTRUCTION
AUTHORIZED BY CONGRESS
CONSIDERED FOR SELECTION UNDER AUTHORIZED PLAN
NATURAL LAKES, PRIVATE RESERVOIRS AND RESERVOIRS OF OTHER GOVERNMENTAL AGENCIES
LOCAL PROTECTION (PRINCIPALLY FOR URBAN AREAS)
COMPLETED OR UNDER CONSTRUCTION
AUTHORIZED BY CONGRESS
CONSIDERED FOR SELECTION UNDER AUTHORIZED PLAN
LEVEES (PRINCIPALLY FOR RURAL AREAS)
COMPLETED OR UNDER CONSTRUCTION
AUTHORIZED BY CONGRESS
CONSIDERED FOR SELECTION UNDER AUTHORIZED PLAN
CHANNEL IMPROVEMENTS
COMPLETED OR UNDER CONSTRUCTION
AUTHORIZED BY CONGRESS
CONSIDERED FOR SELECTION UNDER AUTHORIZED PLAN
NAVIGATION AND FLOOD CONTROL PROJECTS
OFFICE, CHIEF OF ENGINEERS - WASHINGTON, D. C.
NOVEMBER 1948
SCALE OF MILES
GULF OF MEXICO
ATLANTIC OCEAN

ANALYSIS BY THE CORPS OF ENGINEERS OF COST ESTIMATES FOR 182 CIVIL WORKS PROJECTS COMPRISING FISCAL YEAR 1951 PROGRAM

[Money in thousands of dollars]

	River and harbor projects				Flood-control projects				Totals			Actual figures, total	Percentages of cost increases, using authorization estimate as base
	Construction	Relocation	Land	Total	Construction	Relocation	Land	Total	Construction	Relocation	Land		
PROJECT ESTIMATES													
I. Basis for authorization	$1,334,380	$48,986	$42,389	$1,425,755	$999,707	$129,532	$83,523	$1,212,762	$2,334,087	$178,518	$125,912	$2,638,517,000	
II. Support of first construction appropriation	1,893,626	82,240	65,280	2,041,146	1,334,568	184,819	115,571	1,634,958	3,228,194	267,059	180,851	3,676,104,000	39.3
III. Support of fiscal year 1950 appropriation	2,537,812	105,406	82,462	2,725,680	2,285,289	340,889	191,989	2,818,167	4,823,101	446,295	274,451	5,543,847,000	110.1
IV. Support of fiscal year 1951 appropriation	2,564,994	114,906	84,942	2,764,842	2,374,963	366,199	205,316	2,946,478	4,939,957	481,105	290,258	5,711,320,000	116.5
V. Support of fiscal year 1952 appropriation	2,667,680	109,695	67,660	2,845,035	2,469,377	384,873	213,166	3,067,416	5,137,057	494,568	280,826	5,912,451,000	124.0
EXPLANATION OV DIFFERENCE BETWEEN COST ESTIMATES													
(I–II) Between authorized estimate and first construction estimate:													
11. Price changes	499,360	27,573	21,474	548,407	151,312	23,237	22,512	197,061	650,672	50,810	43,986	745,468,000	28.3
12. Authorized project extensions	49,269	5,141	785	55,195	72,856	8,902	1,310	83,068	122,125	14,043	2,095	138,263,030	5.2
13. Changed local needs or situations	11,839	.....	.....	11,839	18,796	4,599	1,530	24,925	30,635	4,599	1,530	36,764,000	1.4
14. Structural and engineering modifications	1,786	.....	632	2,418	33,661	4,829	−515	37,975	35,447	4,829	117	40,393,000	1.5
15. Unforseen conditions	3,777	.....	.....	3,777	30,195	6,173	4,752	41,120	33,972	6,173	4,752	44,897,000	1.7
16. Inadequacy (or excess) in former estimate	−6,785	540	.....	−6,245	28,041	7,547	2,459	38,047	21,256	8,087	2,459	31,802,000	1.2
Total	559,246	33,254	22,891	615,391	334,861	55,287	32,048	422,196	894,107	88,541	54,939	1,037,587,000	39.3
(II–III) Between first construction estimate and estimate for fiscal year 1950:													
21. Price changes	293,456	15,841	4,142	313,439	533,117	82,392	35,555	651,064	826,573	98,333	39,697	964,503,000	36.6
22. Authorized project extensions	136,395	.....	3,463	139,858	231,215	26,707	14,689	272,611	367,610	26,707	18,152	412,469,000	15.6
23. Changed local needs or situations	40,203	790	18	41,011	25,910	7,150	1,994	35,054	66,113	7,940	2,012	76,065,000	2.4
24. Structural and engineering modifications.	44,139	844	689	45,672	46,375	11,414	2,656	60,445	90,514	12,258	3,345	106,117,000	4.0
25. Unforeseen conditions	66,859	2,578	3,988	73,425	71,651	16,123	16,258	104,032	138,510	18,701	20,246	177,457,000	6.7
26. Inadequacy (or excess) in former estimate.	63,134	3,113	4,882	71,129	42,453	12,284	5,266	60,003	105,587	15,397	10,148	131,132,000	5.0
Total	644,186	23,166	17,182	684,534	950,721	156,070	76,418	1,183,209	1,594,907	179,236	93,600	1,867,743,000	70.8
(III–IV) Between estimate for fiscal year 1950													

(III–IV) Between estimate for fiscal year 1950 and fiscal year 1951:														
31. Price changes	$10,492	$88	$97	$10,677	$41,877	$10,799	$11,671	$64,327	$52,369	$10,867	$11,768	$75,004,000		44.8
32. Authorized project extensions	36			36	25,227	497		25,724	25,263	497		25,760,000		15.4
33. Changed local needs or situations	2,750	716	955	4,421	2,939	5,407	385	8,731	5,689	6,123	1,340	13,152,000		7.8
34. Structural and engineering modifications	8,991	−164	744	9,571	10,633	−1,388	−106	9,139	19,624	−1,552	638	18,710,000		11.2
35. Unforeseen conditions	1,624		24	1,648	7,614	5,320	1,390	14,324	9,238	5,238	1,414	15,972,000		9.6
36. Inadequacy (or excess) in former estimate	3,289	8,860	660	12,809	1,384	4,695	−13	6,066	4,673	13,555	647	18,875,000		11.2
Total	27,182	9,500	2,480	39,162	89,674	25,310	13,327	128,311	116,856	34,810	15,807	167,473,000	6.4	100.0
(I–IV) Summary of difference authorized estimate and fiscal year 1951 estimate:														
41. Price changes	803,309	43,502	25,713	872,524	725,520	116,408	64,878	906,806	1,528,829	159,910	90,591	1,779,330,000	67.9	
42. Authorized project extensions	186,000	5,141	4,248	195,389	329,274	36,006	20,860	386,240	515,274	41,247	25,108	581,629,000	22.0	
43. Changed local needs or situations	54,491	1,506	973	56,970	48,454	17,158	3,909	69,521	102,945	18,664	4,882	126,491,000	4.4	
44. Structural and engineering modifications	54,659	680	2,065	57,404	90,670	14,855	2,035	107,560	145,329	15,535	4,100	164,964,000	6.3	
45. Unforeseen conditions	72,461	2,578	4,012	79,051	109,459	27,616	22,400	159,475	181,920	30,194	26,412	238,226,000	9.0	
46. Inadequacy (or excess) in former estimate	59,694	12,513	5,542	77,749	71,879	24,526	7,711	104,116	131,573	37,039	13,253	181,865,000	6.9	
Total	1,230,614	65,920	42,553	1,339,087	1,375,256	236,669	121,793	1,733,718	2,605,870	302,589	164,346	3,072,805,000	116.5	
(IV–V) Between estimate used for fiscal year 1951 appropriation and fiscal year 1952 appropriation:														
51. Price changes	34,620	2,234	1,120	37,974	55,617	8,760	6,230	70,607	90,237	10,994	7,350	108,581,000		54.5
52. Authorized project extensions	−18,761	−19,000	−20,820	−58,581	51,955	1,432	379	53,766	33,194	−17,568	−20,441	−4,815,000		−2.4
53. Changed local needs or situations	5,954			5,954	−401	1,506	965	2,070	5,553	1,506	965	8,024,000		4.0
54. Structural and engineering modifications	43,202	11,555		54,757	−14,258	2,213	−1,482	−13,527	28,944	13,768	−1,482	41,230,000		20.5
55. Unforeseen conditions	28,451		83	28,534	8,410	3,734	320	12,464	36,861	3,734	403	40,998,000		20.4
56. Inadequacy (or excess) in former estimate	9,217		2,335	11,552	−6,909	1,029	1,438	−4,442	2,308	1,029	3,773	7,110,000		3.0
Total	102,683	−5,211	−17,282	80,190	94,414	18,674	7,850	120,938	197,097	13,463	−9,432	201,128,000	7.5	100.0
													124.0	
RECAPITULATION														
(I–V) Sum of difference, authorized estimate and fiscal year 1952 appropriation:														
61. Price changes	837,929	45,736	26,833	910,498	781,137	125,168	71,108	977,413	1,619,066	170,904	97,941	1,887,911,000	71.6	
62. Authorized project extensions	167,239	−13,859	−16,572	136,808	381,229	37,538	21,230	440,006	548,468	23,679	4,667	576,814,000	21.8	
63. Changed local needs or situations	60,445	1,506	973	62,924	48,053	18,664	4,874	71,591	108,498	20,170	5,847	134,515,000	5.1	
64. Structural and engineering modifications	97,861	12,235	2,065	112,161	76,422	17,068	553	94,033	174,273	29,303	2,618	206,194,000	7.8	
65. Unforeseen conditions	100,912	2,578	4,095	107,385	117,869	31,350	22,720	171,939	218,781	33,928	26,815	279,524,000	10.6	
66. Inadequacy	68,911	12,513	7,877	89,301	64,970	25,555	9,149	99,674	133,881	38,068	17,026	188,975,000	7.1	
Total of cost increases	1,333,297	60,709	25,271	1,419,277	1,469,670	255,343	129,643	1,854,656	2,802,967	316,052	154,914	3,273,933,000	124.0	

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REPORT OF COMMITTEE COUNSEL

Summary

The procedure for the initiation of civil-works projects, and their authorization, is regulated by statute and practice. (The authorizations are contained in special acts for individual projects or in omnibus river and harbor and flood-control acts.) However, the steps that follow, looking to the appropriation of money for planning and construction, have not been formalized to the same degree. The result has been that the Corps of Engineers has requested and received tremendous sums of money for these projects without completing the planning of authorized projects, and thereby assuring that sound cost estimates for construction and other important data are furnished to Congress. Such information can be compiled only through careful planning on the part of the Corps of Engineers *after* the statutory authorization of projects and *before* funds are appropriated to initiate construction. Once civil works projects are authorized, experience has shown that the cost has increased inordinately—124 percent for the current program up to fiscal year 1952. Included in this increase are items that better planning would have taken into account and on which savings could have been achieved. These items are (1) inadequacies (errors in estimating), (2) unforeseen conditions, (3) changed local needs, and (4) engineering modifications. They are responsible for a cost increase of $800,000,000, amounting to 30.6 percent of the authorization estimate for the current six billion dollar program.

Congress authorizes civil works projects on the basis of reports known as *survey reports* which are submitted by the Secretary of the Army to Congress and printed. *Survey reports* do not sufficiently develop the details of proposed projects to the extent necessary for consideration of the crucial question by the Appropriations Committees of whether to appropriate funds to start construction. Notwithstanding, in 139 of the current 182 projects the Corps asked for initial construction funds on the basis of *survey reports*, supplemented by general data.

To close the gap between the preliminary planning embodied in the *survey report* and the detailed planning required to initiate construction, the Corps has administratively prescribed that a second report be prepared, based upon detailed planning *after* the *survey report*. This second report is known as a *definite project report* and embodies in detail the necessary engineering and estimating. The *definite project report* constitutes a sound basis upon which the cost of a project may be computed.

The Corps of Engineers has advised the House Appropriations Committee, as recently as April 3, 1951, that construction funds are not requested until after completion of the *definite project report*, because this report does two things:

1. It furnishes "as sound a figure as possible to determine the cost;" and

2. It permits the Corps to "again analyze the economics of the project and, if it is uneconomical based on that estimate," the Corps does not request funds to initiate construction.

The fact of the matter is that of the 182 projects in the 1951 civil works program, the Corps completed *definite project reports* for only 25 before requesting initial construction funds.

In 1949 the Corps first altered the *definite project report* procedure to provide for such reports on sections of projects. These are known as sectional *definite projects reports*. Although they provide detailed planning data on phases of projects, they do not furnish such data for the whole. The Corps has requested initial construction funds on the basis of these sectional reports in 18 of the 182 projects. While the data contained therein is more advanced than that found in the *survey reports*, sound engineering planning and cost estimates for the whole project are still not developed.

The Corps has indicated a desire to defer the completion of *definite project reports* until the construction of projects is approaching completion. In these circumstances, if Congress is to have sufficient information upon which to decide the crucial question of whether to start the construction of projects, it is vital that a new report to be known as the "*planning report*" be compiled by the Corps of Engineers *after* the *survey report* is completed (and the project is authorized) and *before* the Corps requests initial construction funds.

The *planning report* should be similar in format and content to the present *survey report* and to the narrative summary of the present *definite project report*. It should be based upon detailed planning and estimating accomplished after the project is authorized. As is the case with the *survey report*, the *planning report* should be referred by the Chief of Engineers to the Board of Engineers for Rivers and Harbors for review and recommendations. Thereafter the *planning report*, and the Board's recommendations, should be submitted to Congress by the Chief of Engineers through the Secretary of the Army and printed as a Congressional document.

Further, the Chief of Engineers should submit to the Appropriation Committees each January a statement of progress for each project under construction, in such form as to permit ready comparison with the *planning report*.

It is desirable and necessary that appropriate legislation be enacted, effecting the foregoing recommendations. This procedure will formalize the planning of civil works projects subsequent to authorization, and thereby provide Congress with a check on these projects, achieve considerable savings, and eliminate the present unsatisfactory situation wherein Congress is asked to consider the expenditure of hundreds of millions of dollars on the basis of out-dated and insufficiently developed engineering estimates.

The new procedure will also assure to Congress the opportunity of reappraising the benefit-cost ratios of authorized projects. Before the authorization of individual projects, this ratio is required to be favorable, i. e., above unity. Detailed planning after authorization may, as it has in the past, disclose that the corps' estimate of a favorable ratio in the *survey report* was unduly optimistic. The ratio may drop, even below unity, after detailed planning has been completed. In this connection, it is appropriate to extend the statutory requirement of a favorable benefit-cost ratio to river and harbor projects.

The present statutory provision is limited to flood control projects (Flood Control Act of June 22, 1936, 49 Stat. 1570, 33 U. S. C. 701a). By congressional practice it is applied also to river and harbor projects, but the enactment of a provision to apply the criterion specifically to river and harbor projects is desirable.

Finally, the corps should be required to furnish the Appropriations Committees with current, up-to-the-minute cost estimates at the time the committees are considering each year the corps' request for funds. This will be in lieu of the present practice wherein these figures are 7 months old, and older, when presented to the committees. During this period the corps often discovers factors which substantially increase the estimates, separate and apart from the factor of rising construction costs. For example, the cost estimates for the projects now under consideration by the Senate in the pending Civil Functions Appropriation bill are 1 year old, and the corps as of July 1, 1951, has new figures which tentatively increase the fiscal year 1952 estimate of $5,912,451,050 for the current construction program by $116,719,067 to $6,029,170,117. The adoption of this requirement will further assure to the committees a sound basis upon which to exercise their important legislative function.

Other improvements are underway. The Engineer Comptroller has taken the initiative, and directed revisions in the corps' procedure for handling public funds. He has also recently arranged for a continuing, quarterly audit of the corps' financial operations by an independent body—the Army Audit Agency.

The corps has taken steps to assure that expenses for the maintenance and operation of existing waterways be reduced or curtailed entirely in those cases where continued public use has declined or ceased.

Finally, the corps is reinventorying its materials for the purpose of eliminating the expense of carrying obsolete and surplus material.

The corps has demonstrated its awareness of the need for efficient, economical functioning, and is fully conscious of its important responsibilities in civil-works projects.

I. Initiation of Civil Works Projects and Their Authorization—Statutory Procedure

A civil-works project is initiated when a bill is introduced in either House of Congress to authorize the project, or as more often occurs, when the project is included in an omnibus river and harbor or flood-control bill. The first congressional action, if favorable, directs the Corps of Engineers to make a preliminary examination and survey of the proposed project. No preliminary examination or other survey for *new work* may be made by the Corps of Engineers unless specifically authorized by law.[1]

If the *preliminary examination report* by the Corps of Engineers on the proposed project is unfavorable, the unfavorable report is submitted to Congress and no further action may be taken on the project without further congressional direction. In the event the *preliminary examination report* is favorable, the Secretary of the Army is authorized in his discretion to order a *survey report* made and the cost and ad-

[1] Act of July 13, 1892, sec. 8, 27 Stat. 88, 116. All River and Harbor Acts regularly contain this provision including the latest (act of May 17, 1950, 64 Stat. 163.)

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visability of the project reported to Congress.[2] The *survey reports* are submitted to Congress. If favorable, they are printed. Unfavorable *survey reports* are printed if of sufficient importance and interest. About 66 percent of all projects covered by preliminary examinations and surveys are found not justified.

Congressional practice for more than 100 years has been to authorize individual projects only upon the basis of the submission of a *survey report* to Congress by the Corps of Engineers through the Secretary of the Army. This practice was crystallized into statute in the 1946 Flood Control Act which provided that no project for flood control or rivers and harbors, or "any modification not authorized," shall be authorized by Congress unless a report has been previously submitted by the Chief of Engineers in accordance with law.[3] The proposed project with the *survey report* thereon is considered by the Public Works Committees of the House and Senate. If Committee action is favorable, authorization for construction of the proposed project is included in an omnibus River and Harbor and Flood Control bill. With the inclusion of the project in this bill as enacted, the project is authorized (and adopted) by law.

It is apparent from this broad outline that the steps leading to the authorization of a project are carefully regulated by statutory provisions and by congressional practice. Details of these steps are found in such requirements of procedure or limitation as the following:

After the regular or formal report on preliminary examination or survey is submitted to Congress, no *supplemental* or *additional* report may be made unless authorized by law.[4] An exception to this limitation was provided in the 1941 and subsequent Flood Control Acts. These provide that the Secretary of the Army may cause a review to be made of any examination and survey of a flood-control project and a report thereon submitted to Congress if, in his opinion, such review "is required by the national defense or by changed fiscal or economic conditions."[5]

In 1902, Congress by law established within the Corps of Engineers, the Board of Engineers for Rivers and Harbors.[6] One of the primary purposes in creating this Board was to insure greater uniformity in recommendations and reports made to the Congress on river and harbor and flood control projects.[7] During the debate in the House on this 1902 proposal, the chairman of the Committee on Rivers and Harbors stated:

> It is true that to an extent we can decide on these reports and recognize the different standards adopted, but it is very desirable that a uniform standard should be adopted by the executive department, and that a Board of Engineers, 5 in number, familiar with all the works in the country, should review them before they are sent to Congress. *35 Congressional Record 2913.*[8]

[2] Act of March 4, 1913, ch. 144, sec. 3, 37 Stat. 825; 33 U. S. C. 545.

[3] Act of July 24, 1946, sec. 2, 60 Stat. 641; 33 U. S. C. 701o. This limitation was also embodied in the most recent River and Harbor and Flood Control Act (act of May 17, 1950, 64 Stat. 163, sec. 202).

[4] This limitation appeared in the act of September 22, 1922, sec. 12, 42 Stat. 1038, 1043, and has been repeated in all subsequent River and Harbor Acts. It was included in the Flood Control Acts of 1936, 1938, and 1939 but was omitted from subsequent Flood Control Acts. However, it is contained in sec. 110 of the River and Harbor and Flood Control Act of 1950 (act of May 17, 1950, 64 Stat. 163, sec. 110.)

[5] See e. g., act of August 18, 1941, sec. 4, 55 Stat. 638, 648.

[6] Act of June 13 1902, ch. 1079. sec. 3, 32 Stat. 372; 33 U. S. C. 541.

[7] The duties of the Board of Engineers for Rivers and Harbors were extended to flood-control projects by the act of March 1, 1917 (sec. 3, ch. 144, 39 Stat. 950) which blanketed flood-control projects into the statutory procedure prescribed for the initiation and authorization of river and harbor projects.

[8] The membership of the Board was enlarged to seven by Congress in 1913 with a specification that a majority shall be of rank not less than lieutenant colonel. See act of March 4, 1913, sec. 4, 37 Stat. 801, 826; 33 U. S. C. 541.

The Board is required to consider *preliminary examination* and *survey reports* prepared by the Corps of Engineers on proposed projects and to report to the Chief of Engineers its views and recommendations with respect to the desirability of commencing or continuing any and all improvements upon which reports are required. The Board is directed to take into account:[9]

1. The amount and character of commerce existing or reasonably prospective which will be benefited by the improvement;
2. The relation of the ultimate cost of such work, both as to cost of construction and maintenance, to the public commercial interests involved;
3. The public necessity for the work and propriety of its construction, continuance or maintenance at the expense of the United States.

The content of such *preliminary examination* and *survey reports* is required by law to include the following:[10]

1. The cost and advisability of the project;
2. Plans and estimates and a statement as to the rate at which the work should be prosecuted;
3. Full information regarding the present and prospective commercial importance of the project and the benefit to commerce likely to result;
4. The existence and establishment of both private and public terminals and transfer facilities, with appropriate details;
5. The development and utilization of water power for industrial and commercial purposes;
6. Information concerning the effect on the configuration of shore lines where the mouth of any river or inlet is involved;
7. A statement of special or local benefit which will accrue to localities affected by such improvement and a statement of general or national benefits, with recommendations as to what local cooperation should be required, if any, on account of such special or local benefit; and
8. Such other subjects as may be properly connected with the study.[11]

Congress has required in the various River and Harbor and Flood Control Acts that the Corps of Engineers compile and file with Congress periodically a report of the preliminary examinations, surveys, and appropriations for works of river and harbor improvements.[12] This type of periodic report states whether the *preliminary examination reports* were favorable or unfavorable for survey, and gives pertinent details with respect to *survey reports*, including a statement as to whether they were favorable or unfavorable.

Congress has also provided that no project may be considered by a congressional committee, except with a view to a further survey, if 5 years have elapsed since the submission of a *survey report* on such a project.[13]

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[9] 33 U. S. C. 541.

[10] 33 U. S. C. 545, 546a, 547.

[11] In addition to these matters the 1917 act (*supra*, footnote 7) in section 3 directed the Board in considering flood-control projects to state its opinion as to—

"(a) what Federal interest, if any, is involved in the proposed improvement;

"(b) what share of the expense, if any, should be borne by the United States; and

"(c) the advisability of adopting the project."

[12] The most recent River and Harbor and Flood Control Act, act of May 17, 1950, 64 Stat. 163, requires in sec. 108 that the Secretary of the Army prepare and submit to Congress at the earliest practicable date such a report for the period subsequent to January 1, 1936. Such report is to be similar to the report printed in H. Doc. 106, 76th Cong., 1st sess., which covered the period ending January 1, 1936.

[13] Act of September 22, 1922, sec. 9, 42 Stat. 1038, 1043; 33 U. S. C. 568.

With respect to the flood-control projects adopted in the 1950 River and Harbor and Flood Control Act, Congress stipulated that such authorizations shall expire 5 years from the date on which local interests are notified in writing by the Department of the Army of the requirements of local cooperation, unless the local interests furnish satisfactory assurances to the Secretary of the Army within such time that the required cooperation will be furnished.[14] This statutory stipulation had appeared as early as 1941.

In order that resurveys may be made of projects which had previously been reported on in either *preliminary examination* or *survey reports*, it has been provided that the Committee on Public Works of either the House or the Senate may, by resolution, request the Chief of Engineers for a new report.[15] In such new report, the Board is prohibited from extending the scope of the project contemplated in the original report which it is reviewing, or in the provision of law authorizing the original examination or survey.

There is still further evidence of congressional will to assure that the public funds will not be committed to civil-works projects until carefully considered. The most recent River and Harbor and Flood Control Act reenacted the following restriction:

> The Government shall not be deemed to have entered upon any project for the improvement of any waterway or harbor mentioned in this title until the project for the proposed work shall have been adopted by law.[16]

In summary, statutes and congressional practice have prescribed a well-regulated procedure for the initiation and authorization of civil-works projects.

II. Appropriation of Funds to Initiate Construction of Authorized Projects

The formal and precise manner in which projects are initiated and authorized has just been stated. However, the procedure governing consideration by the respective Appropriations Committees of the House and Senate of the appropriation of initial and continuing funds for the construction of projects has not been formalized to the same degree. Congress has relied upon data and cost estimates presented by the Corps of Engineers. In many cases this information was based on out of date and insufficiently developed planning on the part of the corps. The present procedure appears to be this:

In the late summer and fall of each year, the Corps of Engineers submits to the Bureau of the Budget requests for funds for those projects which have been previously authorized by law in the River and Harbor and Flood Control Acts. As discussed earlier, these authorizations were based upon carefully prepared *survey reports*. The corps' request to the Bureau of the Budget may be for planning funds or for construction funds, or both. Planning funds are requested for the purpose of developing in detail all aspects of an authorized project so that a sound estimate for the construction cost of the total project will be achieved, and so that plans and specifications may be drawn. The Corps of Engineers is not in a position to furnish Congress with sound estimates of the cost of construction until planning funds have been made available and until the planning has been completed.

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[14] Act of May 17, 1950, sec. 201, 64 Stat. 163.
[15] Act of March 4, 1913, ch. 144, sec. 4, 37 Stat. 826, 33 U. S. C. 542.
[16] River and Harbor Act of May 17, 1950, 64 Stat. 163. Earlier acts contain similar restrictions; see, e. g., act of January 21, 1927, sec. 4, 44 Stat. 1010, 1016; act of July 3, 1930, sec. 2, 46 Stat. 918, 933.

(However, the corps has repeatedly requested funds for the initiation of construction *before* planning has been completed.)

The Bureau of the Budget reviews the requests of the Corps of Engineers for funds and includes approved items in the budget of the President which is submitted to Congress. Some 7 or 8 months after the corps has furnished cost figures to the Bureau of the Budget, the Subcommittee on Army Civil Functions of the House Appropriations Committee considers these requests for funds. Witnesses from the Corps of Engineers appear before the subcommittee and supply data in justification of the requests for money. In addition, Members of Congress, Senators, officials of State and local governments, and other interested parties appear before the subcommittee to request funds for a particular project or projects.

The subcommittee very carefully studies the data and information supplied to it by representatives of the corps and considers all aspects of those projects for which funds are requested. The information thus placed before the subcommittee and the additional information elicited by the subcommittee from the corps and other witnesses provides the basis upon which the subcommittee determines to grant or withhold funds for particular projects. Unfortunately, the information placed before the subcommittee by the Corps of Engineers frequently is not complete and current, and the subcommittee, therefore, does not have available sound planning data and estimates upon which to exercise this important legislative function.

Recent appropriations history of civil-works projects

Civil-works projects were suspended almost entirely during World War II. Toward the close of that war, Congress directed the resumption of civil-works projects as soon as practicable by providing in the 1944 Flood Control Act as follows:

> SEC. 10. That the following works of improvement are hereby adopted and authorized with a view toward providing an adequate reservoir of useful and worthy public works for the postwar construction program: *Provided*, That the necessary plans, may be prosecuted during the war, so as to be ready for rapid inauguration of a postwar program of construction: *Provided further*, That when the existing critical situation with respect to materials, equipment, and manpower no longer exists, and in any event not later than immediately following the cessation of hostilities in the present war, the projects herein shall be initiated as expeditiously and prosecuted as vigorously as may be consistent with budgetary requirements:

The Corps of Engineers furnished information to Congress with respect to those civil-works projects on which construction could be continued or initiated. As a result, Congress appropriated $106,875,000 for 140 projects in the first Deficiency Appropriation Act of 1946. This was followed by the regular fiscal year 1947 appropriation of $174,644,750 which added new projects. Thus, in less than a year the civil-works construction program embraced 200 projects including many large dams which naturally would require several years for completion. Some of the projects initiated in 1946 and 1947 are still under construction and are in the 1952 budget.

In the case of many of these projects, funds for the initiation of construction were appropriated and construction was started, even though the Corps of Engineers had not developed its planning to the point that sound construction estimates for the entirety of each project could be computed, and before the corps' planning had reached the stage where miscalculations of engineering estimating in the

survey report could be corrected. In addition, the construction cost criterion used by the corps for these projects was that of the 1939–40 period, upon the theory that that period represented the last comparatively normal construction year prior to World War II. The fact of the matter is that costs have not returned to the 1939–40 level and, on the contrary, have continuously increased, year by year, to the present all-time high.

The net result has been that the cost of the civil works program of the corps, embracing 182 projects has risen 124 percent above the cost estimate reported to Congress in the *survey reports* upon which authorizations of the projects were based. In dollars, the cost increase has been from $2,638,517,000 to $5,912,451,000. The latest figures available which are as of July 15, 1951, increased the total cost by another $116,719,000 to $6,029,170,000.[16a]

This tremendous increase in the cost of civil works program over and above the cost estimates originally furnished Congress caused serious concern on the part of the House Appropriations Committee in 1950. The committee commented in a report as follows:[17]

> It would seem obvious, therefore, that more adequate engineering and fiscal controls should be developed in order that the work of the Corps of Engineers may more closely represent the wishes of the Congress. Insofar as the House Committee on Appropriations is concerned, the Corps of Engineers will be expected more accurately to estimate costs in advance of construction and more closely conform to its original estimates. Where deviations are subsequently made either in engineering or structural design such deviations will have to be justified in detail. Appropriations for initiating construction on many projects in the past have been approved by the committee in the belief that the ultimate Federal cost would be approximately as stated by the Corps of Engineers. Undoubtedly, in a number of instances no funds for initiating construction would have been granted had the committee been aware of the likelihood that the total estimated Federal cost would subsequently be increased.

The committee was so seriously disturbed by this problem that on March 29, 1950, it directed its investigative staff to undertake a comprehensive study of the policies, practices, and procedures of the Corps of Engineers. The investigative staff commenced its work in the Office of the Chief of Engineers in Washington. There the staff studied very closely the policies and functioning of the corps. Thereafter, the staff went out into the field and studied actual construction operations on the site of projects totaling in cost $1,422,686,900. The following statement shows the scope of the committee staff's work in the field:

EXHIBIT 1

CORPS OF ENGINEERS PROJECTS STUDIED IN THE FIELD DURING 1950 BY THE INVESTIGATIVE STAFF OF THE HOUSE APPROPRIATIONS COMMITTEE

The investigative staff during 1950 visited the Office of the Chief of Engineers, 3 division offices and 10 district offices. The professional personnel which conducted this study included engineers, accountants and investigators.

In each district staff members analyzed two or more civil works projects and examined the general practices and policies of the corps in the field of civil works. These analyses and examinations embraced a study and review of files, records and reports, discussion with corps' personnel and field trips to the construction sites of several projects. There are identified below the 25 projects which were closely studied by the staff. These projects have an estimated cost of approximately $1½ billion (1951 construction cost). In addition, the staff reviewed and discussed with corps' field personnel the bulk of all projects then under construction

[16a] The $116,719,000 was reported by the corps' field offices to Washington, and the increase has not yet been approved by the Chief of Engineers.

[17] H. Rep. No. 1797, 81st Cong., 2d sess., March 21, 1950.

in each of the offices visited. The 10 district offices visited were supervising the construction of projects having an estimated cost of $2,900,000,000, which represented approximately 50 percent of the total estimated cost (approximately $6 billion) of those projects comprising the fiscal year 1951 program.

The 25 projects studied in the field by the staff are as follows:

Columbia River Basin:	
McNary project, Washington and Oregon	$270, 000, 000
Lookout project, Oregon	88, 230, 000
Detroit project, Oregon	69, 797, 000
Lucky Peak project, Idaho	22, 000, 000
Willamette Falls lock, Oregon	10, 000, 000
Sacramento-San Joaquin River Basin:	
Pine Flat, Calif	51, 121, 000
Folsom, Calif	50, 792, 000
Isabella, Calif	19, 050, 000
Farmington, Calif	3, 729, 000
Missouri River Basin:	
Oahe, S. Dak. and N. Dak	245, 900, 000
Fort Randall, S. Dak	170, 200, 000
Ohio River Basin:	
Dillon Reservoir, Ohio	23, 900, 000
Dewey Reservoir, Ky	6, 716, 000
Cumberland River Basin:	
Wolf Creek project, Kentucky	82, 700, 000
Center Hill project, Tennessee	45, 700, 000
Cheatham lock and dam project, Tennessee	14, 000, 000
Lock No. 4, Cumberland River, Tenn. (existing structure)	----------
Arkansas River Basin:	
Fort Gibson project, Oklahoma	45, 000, 000
Tenkiller project, Oklahoma	21, 750, 000
Apalachicola River Basin:	
Jim Woodruff project, Florida	42, 208, 000
Buford project, Georgia	40, 225, 000
Ouachita River Basin:	
Blakley Mountain project, Arkansas	32, 675, 000
Narrows project, Arkansas	12, 950, 000
Brazos River Basin: Whitney project, Texas	42, 043, 900
Trinity River Basin: Benbrook project, Texas	12, 000, 000
Total all projects analyzed by committee staff	1, 422, 686, 900

The report of the committee staff was made to the committee on January 23, 1951, and was turned over by the committee on April 3, 1951, to the Chief of Engineers with the request that he prepare within 2 weeks such comments thereon as he may deem appropriate. The Corps of Engineers filed its formal answer with the committee on April 16, 1951.

In its answer the corps commented in detail on the 26 recommendations for improvement made by the committee staff and on the other matters contained in the staff report. The issues framed by the staff report and the corps' answer were of such broad outline and at the same time so specific in detail that a development of them in hearings would be impracticable. Counsel for the committee, being of this view, initiated a series of conferences with the Corps of Engineers for the purpose of seeking to achieve broad improvements in principle, and the execution thereof. These conferences were participated in, at the direction of the Secretary of the Army, by Fred Korth, Esq., deputy counselor of the Department of the Army, and by Harold Pearson of the Office of the Assistant Secretary of the Army for General Management. Great strides forward have been accomplished. Committee counsel, on the basis of his own opinion and the views informally expressed by responsible officials of the

corps, believe that the procedure whereby appropriation consideration is given by congressional committees to the corps' requests for funds, should be formalized to the extent necessary to assure completion of careful planning of authorized projects before initial construction funds are requested. By this improvement, the committees will be furnished full and up-to-date information on each project, including a sound estimate for the total construction cost of each project.

As the basis for this step forward, it is desirable to consider important ultimate facts which demonstrate the pressing need for improvement, and also to outline in detail the features of the improvement itself.

III. The Present Procedure for Furnishing Data to the Appropriations Committee

The Subcommittee on Army Civil Functions of the House Appropriations Committee delved into the fundamentals of the corps' requests for funds in asking questions of Maj. Gen. Lewis A. Pick, Chief of Engineers, and other representatives of the Corps of Engineers, in the hearings of April 3, 1951. Members of the subcommittee traced the development of a project from its inception as an idea in the mind of a proponent through its authorization, construction, and completion. The subcommittee was particularly interested in the events occurring between the authorization of a project in the authorizing act and the consideration of the project by the House Appropriations Committee. The testimony of General Pick and Colonel Potter in the hearings on this point is as follows:

Basis for Requesting Funds for Authorized Projects

Mr. Rabaut. When a project has been authorized, what is your basis for requesting funds for it?

General Pick. When a project is authorized, then we include that particular project in our construction program. We include funds in there which we consider are necessary for the starting of the project.

Mr. Rabaut. Planning funds?

General Pick. Planning funds first. I was thinking about construction. As soon as we get a project authorized, the detailed plans and specifications have to be made up, and, if it meets the budget criteria we include funds for engineering planning, to make up plans and specifications. When the plans are completed, construction funds are requested in a subsequent budget. We figure out a program of construction for the particular project and determine what is the minimum amount of funds we would need for carrying on the preliminary construction work during the first year and include that in the budget. Each year after that, if money is appropriated, we ask for additional funds to carry the work on to completion.

Mr. Rabaut. Now the project is authorized and planned. Up until this time you have gone through a study of the project?

General Pick. Yes, sir. The first money that we get for planning is used to make up what we call a definite project report to determine all of the physical features of the project and to work up design criteria. That may take a year or, if it is a big project, 2 years. If, for instance, it is a dam, we thoroughly drill the site; we determine the soil conditions; we determine the stream-flow conditions; we determine all of the physical data it is possible to determine which would have any bearing on this project's design. Then we take that information and work up a preliminary design of the general features of it in what we call this definite project report. That is carefully studied by the field, and finally comes to my office, and my engineering division reviews the definite project report. The review may cause some changes in the project.

For instance, when you build a big dam, you have to determine where the spillway is going to be and where, if it is a multiple-purpose project, the flood-control tunnels will be, and where the power intake tunnels will be; you have to determine what kind of a structure you are going to build, whether an earth- or rock-fill dam or a concrete dam; you have to determine the capacities of the spillways and capacities of the tunnels; you have to determine the foundation conditions. You have to determine where you are going to get the material and what kind of material is going into the structure; you have to find out where you are going to get the concrete aggregate and about what it will cost to get it; you have to determine where you are going to get the riprap rock you are going to use to face the dam, if it is an earth dam, to prevent deterioration of the structure from wave wash.

Mr. RABAUT. You have to determine what it affects in the background, too?

General PICK. You have to determine what effects it will have; you have to determine the land-acquisition problems; you have to determine what relocations will have to be made of highways, railroads, buildings, and the like. All of that goes into this definite project report in order to come up with as sound a figure as possible to determine the cost.

After doing all that, then we get some funds to start making up detailed plans and specifications, and we work those up. When that is done, we are ready to ask for construction funds.

Colonel POTTER. If I may add one sentence there, after the definite project report is completed, we then again analyze the economics of the project and, if it is uneconomical based on that estimate, we do not come in for construction funds. And that has happened.

General PICK. In other words, if it is going to cost too much and we do not have a favorable economic ratio, we just defer the project.

Mr. RABAUT. So it is quite some long while before you know what a project is actually going to cost?

General PICK. That is right. After we make up this definite project report we have a best estimate possible to get short of actually opening up the site.

Mr. RABAUT. In the past it has developed that you just did not know and that you put in estimates on those reports that were far off? I do not want to get into any specific report now, because I have asked you to analyze those two reports we got from our investigative staff, but I am asking some general questions to try to avoid what we walked into in the past.

General PICK. Let me tell you this: When you get that definite project report made up, you are getting down to the practical side of this thing; you are getting down to the building side. You go in there and you drill this whole area around here, and the amount of money you put in there is the amount which we consider to be an adequate amount of drilling to determine foundation conditions. Then you go in there after carefully studying this and start the building, and you encounter things that do not act like they should.

Mr. RABAUT. That were not apparent originally?

General PICK. That is right. For instance, you get into a foundation where you have a bentonite seam about like that [illustrating]. It looks dry and it looks good, and you make tests to see what it will stand, and it comes within reasonably safe limits, and you go ahead and start working on that. You get back in there during construction and find, instead of acting the way we anticipated, that the material is just like slippery elm: the whole side of the hill starts slipping in. Then you really have trouble on your hands, and you have to take steps you had not figured on, the cost of which was, of course, not in the estimate.

(After discussion off the record.)

Mr. RABAUT. When do you formulate a practical cost basis prior to the authorization?

General PICK. You make up as good as estimate as you possibly can with the funds you have available for that survey report.

Mr. RABAUT. As good as you possibly can?

General PICK. That includes some drilling of foundations.

Mr. RABAUT. There is a certain amount of guesswork in there; is there not?

General PICK. There is bound to be, because we do not spend money and we would not justify spending money to make up a definite project report on every site we investigate. For instance, you go to build a big dam and we have a site here, here, here, and here—maybe half a dosen of them—that we have to study, and from the examination we make we will probably do some drilling on all of those. But it costs money. We try to determine which one of those is the best site.

Mr. RABAUT. And at which one you are certain the foundation is right?

General PICK. Which one has the best foundation. Then we estimate the cost of such a structure as we visualize there and put that in the report. That is based upon what a similar structure would cost us at the particular time we worked up the report.

Colonel POTTER. I might add one thing just to bring in finite figures. In the survey report investigations of the dam site, we might use 5 holes to determine the geology, but when we make up the definite project report, we may put down 30 to 50 holes to find out more data on the geological structure.

General PICK. Suppose we go down there and prepare a survey report based on five or six or maybe a dozen holes across this foundation, 100 feet apart, and suppose when we come back there to start construction we find a fault going right down through the middle between two of those holes. That happens in a lot of geology we run into in this country. When we run into a fault like that, we must take appropriate engineering action.

It is to be noted that both General Pick and Colonel Potter informed the committee that the following steps occurred between the authorization of a project and the corps' request for initial construction funds: (1) The Corps of Engineers asks for planning funds with which to prepare and complete a *definite project report*. (2) On the basis of this report, the corps is then able to compete "as sound a figure as possible to determine the cost." (3) Thereafter, the corps asks for funds to start making up detailed plans and specifications. (4) After that has been achieved, the corps first asks for initial construction funds.

An analysis of the 182 projects in the 1951 civil works program readily demonstrates that this procedure is seldom observed. The following is a statement prepared by the Corps of Engineers showing the status of the *definite project reports* for each of the 182 projects at the time that initial construction funds were requested by the Corps of Engineers:

EXHIBIT 2

STATUS OF DEFINITE PROJECT REPORT FOR EACH OF 182 PROJECTS OF FISCAL YEAR 1951 PROGRAM WHEN INITIAL CONSTRUCTION FUNDS WERE REQUESTED BY THE CORPS OF ENGINEERS

1. Review of the history of the 182 projects which comprised the civil works program for the fiscal year 1951 indicates the status of definite project reports and studies when initial construction funds were first requested from the Bureau of the Budget as follows:

Status	*Number of projects*
(*a*) Definite project report complete for entire project	25
(*b*) Sections of definite project complete or advanced stage of definite project studies	18
(*c*) Survey report data used as basis, with costs brought up to date by indexes in some cases	89
(*d*) Definite project report procedure not required	50
Total	182

2. The tabulation herewith shows the individual projects falling into each of the categories summarized above.

3. This analysis shows for about 50 percent of the fiscal year 1951 program initial requests for construction funds were based on complete definite project reports, sectional definite project reports and studies, or the definite project report procedure was not required. For the remaining 50 percent, initial construction fund requests were based on survey reports with estimates brought up to date in more recent years by application of cost indexes. Definite project reports or studies were available for about one-third of the projects for which the DPR procedure was required.

4 In consideration of this analysis it should be borne in mind that for some 40 projects, of the list of 182, construction funds were first requested for the fiscal years 1938 and 1939 or for the fiscal years 1945, 1946, and 1947. In the first in-

stance, involving the fiscal year 1938–39 projects, lack of time and nonavailability of planning funds after enactment of the first Flood Control Act of 1936 precluded the preparation of definite project reports and it was necessary to utilize survey report data in making requests for construction funds in most cases. The second instance, involving fiscal years 1945, 1946, and 1947 projects, illustrates the requests for construction funds which were made toward the end of and immediately after World War II, in order to place under way a postwar civil works program.

Status of definite project report for each of 182 projects of fiscal year 1951 program when initial construction funds were requested by Corps of Engineers

A. DEFINITE PROJECT REPORT COMPLETE FOR ENTIRE PROJECT

Name	*Date of authorization*
Flood control:	
Bull Shoals Reservoir	1941
Lawrenceburg	1938
Fall River Reservoir	1941
Hutchinson	1936
Ashland	1938
Covington	1938
Maysville	1938
Adams	1941
North Adams	1936 and 1941
Harlan County Reservoir	1938 to 1944
Hoosick Falls	1936 and 1941
Hornell	1936 and 1938
Great Salt Plains Reservoir	1936
Hulah Reservoir	1936
Oologah Reservoir	1936 and 1946
Heyburn Reservoir	1946
Wister Reservoir	1938
Sunbury	1936 and 1941
Fort Randall Reservoir	1944
Center Hill Reservoir	1938
Memphis, Wolf River and Nonconnah Creek	1937 to 1946
Garza-Little Elm Reservoir	1945
Lavon Reservoir	1945
Philpott Reservoir	1944
Rivers and harbors: Morgantown lock and dam	1909

Total, 25 projects.

B. SECTIONS OF DEFINITE PROJECT COMPLETE OR ADVANCED STAGE OF DEFINITE PROJECT STUDIES

Name	*Date of authorization*
Flood control:	
Norfork Reservoir	1938 and 1941
Farmington Reservoir	1944
Grand Tower drainage and levee district	1938
Miller Pond drainage and levee district	1938
Savage River Reservoir	1946
Dillon Reservoir	1938
Massillon	1938
Denison Reservoir	1938
Kaw	1936
Tenkiller Ferry Reservoir	1938 and 1946
East Branch Clarion River Reservoir	1938 and 1944
Fall River Basin	1941
Grapevine Reservoir	1945
Rivers and harbors:	
Jim Woodruff lock and dam	1945 and 1946
Buford Dam	1946
Port Sanilac Harbor	1945
St. Anthony Falls	1937 and 1945
Chief Joseph Dam	1946

Total, 18 projects.

Status of definite project report for each of 182 projects of fiscal year 1951 program when initial construction funds were requested by Corps of Engineers—Con.

C. SURVEY REPORT DATA USED, WITH COSTS BROUGHT UP TO DATE BY INDEXES IN SOME CASES

Name	*Date of authorization*
Flood control:	
Tucson diversion channel	1948
Blakely Mountain Reservoir	1944
Narrows Reservoir	1941 and 1944
Nimrod Reservoir	1938
Red River levees and bank stabilization below Denison Dam	1946
West of Morilton	1936 and 1944
Cherry Valley Reservoir	1944
Folsom Reservoir	1944 and 1949
Isabella Reservoir	1944
Los Angeles County drainage area (exclusive of Whittier Narrows Reservoir)	1936 to 1941
Merced County stream group	1944
Pine Flat Reservoir	1944
Whittier Narrows Reservoir	1941
Mansfield Hollow Reservoir	1941
Winsted	1941
Central and southern Florida	1948
Clark Hill Reservoir	1944
Lucky Peak Reservoir	1946
Columbia drainage and levee district	1936
Chouteau, Nameoki, and Venice drainage and levee district	1936
Degognia and Fountain Bluff drainage and levee district	1936
East Cape Girardeau and Clear Creek drainage and levee district	1936
East St. Louis and vicinity	1936
Farm Creek Reservoirs	1944
Galena	1944
Prairie du Rocher and vicinity	1946
Wood River drainage and levee district	1938
Cagles Mill Reservoir	1938
Cannelton	1936 and 1937
Indianapolis	1936 and 1938
Evansville	1936 and 1937
New Albany	1938
Coralville Reservoir	1938
Little Sioux River	1947
Missouri River agricultural levees	1944
Kansas City	1936 and 1944
Wichita and Valley Center	1936
Dewey Reservoir	1938
Louisville	1938
Newport	1937
Wolf Creek Reservoir	1938
Bayou Teche and Vermilion River	1941
Mermentau River	1941 and 1946
Shreveport	1944
Cumberland and Ridgeley	1936 and 1946
Knightville Reservoir	1938 and 1941
Red Run	1948
Red Lake and Clearwater Rivers	1944
Red River of the North	1948
Chariton River	1944
Perry County levee district Nos. 1, 2, and 3	1936
Jemez Canyon Reservoir	1948
Montour Falls	1941
Mount Morris Reservoir	1944
Olean	1946

Status of definite project report for each of 182 projects of fiscal year 1951 program when initial construction funds were requested by Corps of Engineers—Con.

C. SURVEY REPORT DATA USED, WITH COSTS BROUGHT UP TO DATE BY INDEXES IN SOME CASES—continued

Name	*Date of authorization*
Flood control—Continued	
Portville	1946
Buggs Island Reservoir	1944
Baldhill Reservoir	1944 and 1946
Garrison Reservoir	1944
West Fork of Mill Creek Reservoir	1946
Canton Reservoir	1938
Fort Gibson Reservoir	1941, 1944, and 1946
Oklahoma City floodway	1946
Detroit Reservoir	1938 to 1948
Dorena Reservoir	1938
Fern Ridge Reservoir	1938
Lookout Point Reservoir	1938 and 1950
Umpqua River and tributaries	1941
Conemaugh River Reservoir	1936 and 1938
Williamsport	1936 and 1948
York	1936 and 1938
Oahe Reservoir	1944
Belton Reservoir	1946
Benbrook Reservoir	1945
Fort Worth floodway	1945
Hords Creek Reservoir	1941 and 1944
San Angelo Reservoir and floodway	1941 and 1944
Texarkana Reservoir	1946
Whitney Reservoir	1941 and 1944
Mud Mountain Reservoir	1936
Sutton Reservoir	1938
Rivers and harbors:	
Demopolis lock and dam	1945
Sacramento River (Sacramento deep-water channel)	1946
San Diego River and Mission Bay	1946
Mississippi River between the Ohio and Missouri Rivers (Chain of Rocks Canal)	1945
Cheatham lock and dam, Cumberland River	1946
St. Marys River, new power plant	1945
McNary lock and dam	1945
Schuylkill River above Fairmount Dam	1946

Total, 89 projects.

Status of definite project report for each of 182 projects of fiscal year 1951 program when initial construction funds were requested by Corps of Engineers—Con.

D. DEFINITE PROJECT REPORT PROCEDURE NOT REQUIRED

Name	*Date of authorization*
Flood control:	
Sacramento River major and minor tributaries	1944
Rosiclare	1948
Muskingum River Reservoirs	1938 to 1946
Willamette River (bank protection)	1936 to 1950
Rivers and harbors:	
Nome Harbor	1917 to 1948
Wrangell Narrows	1925 to 1945
Arkansas River and tributaries (part for which appropriation requested)	1946 and 1950
Crescent City Harbor	1918 and 1945
Potomac River (north side, Washington Channel)	1935
Jacksonville Harbor	1907 to 1945
Tampa Harbor	1899 to 1950
Savannah Harbor	1874 to 1946
Illinois waterway	1927 to 1946
Mississippi River between the Ohio and Missouri Rivers (regulating works)	1881 to 1930
Mississippi River between the Missouri River and Minneapolis, excluding St. Anthony Falls and lock 19	1930 to 1950
Ohio River:	
Lock and dam construction	1910 and 1918
Open channel work	1827 to 1930
Missouri River, Kansas City to Sioux City	1927 and 1945
Calcasieu River and Pass	1937 to 1946
Gulf Intracoastal Waterway (New Orleans district)	1925 to 1946
Pearl River	1935
Waterway from Empire to Gulf of Mexico	1946
Portland Harbor	1836 to 1946
Baltimore Harbor and channels	1917 and 1945
Boston Harbor	1825 to 1946
Fall River Harbor	1930 and 1946
St. Mary's River, navigation features	1870 to 1946
Missouri River, Kansas City to mouth	1912 to 1945
Fort Peck Dam	1935 to 1944
Newark Bay, Hackensack and Passaic Rivers	1907 to 1945
New York and New Jersey channels	1935 and 1950
Buffalo Harbor	1912 to 1945
Great Lakes to Hudson River waterway	1935 to 1945
Hudson River channel	1913 to 1937
New York Harbor, entrance channels and anchorage areas	1884 to 1937
Cleveland Harbor	1896 to 1946
Lorain Harbor	1899 to 1945
Columbia River and tributaries	1935 to 1945
Bonneville lock and dam	1935 and 1937
Coos Bay	1910 to 1948
Locks 2, Monongahela River	1909
Georgetown Harbor	1945 and 1948
Houston Ship Channel	1905 to 1948
Gulf Intracoastal waterway (Galveston district)	1925 to 1950
Sabine-Neches waterway	1912 to 1950
Trinity River, channel to Liberty	1945 and 1946
Norfolk Harbor	1884 to 1948
York Spit Channel	1905 to 1945
St. Thomas Harbor	1937
Grays Harbor and Chehalis River	1896 to 1948

Total, 50 projects.

Two tables have been prepared from the corps' statement, which show that *definite project reports* had not been completed on 139 of the 182 projects at the time the corps requested initial construction funds.[18] These two tables are as follows:

EXHIBIT 3

89 projects in the 1951 civil works program (of 182 projects) for which the Corps of Engineers did not complete definite project reports before requesting initial construction funds [1]

Name of project	Authorization date	Authorization estimate	1952 fiscal year estimate
FLOOD CONTROL			
1. Tucson diversion channel	1948	$2,390,000	$2,390,000
2. Blakely Mountain Reservoir	1941	11,080,000	32,675,000
3. Narrows Reservoir	1941 and 1944	6,470,000	12,950,000
4. Nimrod Reservoir	1938	2,888,000	3,895,900
5. Red River levees and bank stabilization below Denison Dam	1946	5,500,000	8,730,000
6. West of Morilton	1936 and 1944	603,000	2,156,100
7. Cherry Valley Reservoir	1944	3,827,000	8,000,000
8. Folsom Reservoir	1944 and 1949	18,474,000	50,792,000
9. Isabella Reservoir	1944	6,800,000	19,050,000
10. Los Angeles County drainage area (exclusive of Whittier Narrows Reservoir).	1936 to 1941	70,000,000	301,605,600
11. Merced County stream group	1944	1,300,000	2,700,000
12. Pine Flat Reservoir	1944	19,700,000	51,121,000
13. Whittier Narrows Reservoir	1941	16,983,000	36,320,000
14. Mansfield Hollow Reservoir	1941	3,090,000	7,550,000
15. Winsted	1941	140,000	171,500
16. Central and southern Florida	1948	58,600,000	58,129,000
17. Clark Hill Reservoir	1944	35,300,000	78,400,000
18. Lucky Peak Reservoir	1946	11,544,000	22,000,000
19. Columbia drainage and levee district	1936	546,000	2,485,000
20. Chouteau, Nameoki, and Venice drainage and levee district.	1936	132,000	192,000
21. Degonia and Fountain Bluff drainage and levee district.	1936	330,000	4,763,000
22. East Cape Girardeau and Clear Creek drainage and levee district.	1936	395,000	1,475,000
23. East St. Louis and vicinity	1936	1,158,000	12,092,000
24. Farm Creek reservoirs	1944	3,017,900	10,384,500
25. Galena	1944	418,000	827,800
26. Prairie du Rocher and vicinity	1946	2,575,000	3,719,000
27. Wood River drainage and levee district	1938	750,000	11,784,000
28. Cagles Mill Reservoir	1938	1,478,000	4,623,000
29. Cannelton	1936 and 1937	1,040,000	1,985,500
30. Indianapolis	1936 and 1938	1,560,000	7,550,000
31. Evansville	1936 and 1937	2,142,800	9,000,000
32. New Albany	1938	2,900,000	6,200,000
33. Coralville Reservoir	1938	4,999,000	16,839,000
34. Little Sioux River	1947	3,320,000	4,100,000
35. Missouri River agricultural levees	1944	65,750,000	124,837,000
36. Kansas Citys	1936 and 1944	10,000,000	41,389,000
37. Wichita and Valley Center	1936	2,603,100	11,525,000
38. Dewey Reservoir	1938	3,940,000	6,716,000
39. Louisville	1938	4,500,000	25,700,000
40. Newport	1937	1,411,000	7,000,000
41. Wolf Creek Reservoir	1938	29,100,000	82,700,000
42. Bayou Teche and Vermillion River	1941	1,390,000	2,945,000
43. Mermenthau River	1941 and 1946	970,000	5,000,000
44. Shreveport	1944	3,000,000	3,950,000

See footnote at end of table, p. 92.

[18] The Corps of Engineers initiated the *definite project report* procedure in 1936. Prior to 1936, Congress authorized 41 projects of the 182 in the program now under construction. However, the corps has never in the past required *definite project reports* for projects of this type, and does not today.

Another factor to be considered is the corps' statement that certain other projects may not provide a fair basis for comparison; i. e., projects for which initial construction funds were requested in fiscal years 1938–39 and 1945–47. The corps explains:

"In the first instance, involving the fiscal years 1938–39 projects, lack of time and nonavailability of planning funds after enactment of the first Flood Control Act of 1936 precluded the preparation of definite project reports and it was necessary to utilize survey report data in making requests for construction funds in most cases. The second instance, involving fiscal years 1945, 1946, and 1947 projects, illustrates the requests for construction funds which were made toward the end of and immediately after World War II, in order to place under way a postwar civil works program."

However, the fairness of using the 21 projects authorized from 1948 to date is beyond challenge. On none of these were *definite project reports* prepared before the corps requested initial construction funds. The 21 projects total $741,670,359 of the authorization estimate and $1,309,588,100 of fiscal year 1952 estimate.

89 projects in the 1951 civil works program (of 182 projects) for which the Corps of Engineers did not complete definite project reports before requesting initial construction funds—Continued

Name of project	Authorization date	Authorization estimate	1952 fiscal year estimate
FLOOD CONTROL—continued			
45. Cumberland and Ridgeway	1936 and 1946	$7,420,000	$12,900,000
46. Knightville Reservoir	1938 and 1941	1,940,000	3,215,000
47. Red Run	1948	1,010,000	1,065,000
48. Red Lake and Clearwater Rivers	1944	902,940	3,375,900
49. Red River of the North	1948	9,928,000	11,548,400
50. Chariton River	1944	1,610,270	2,740,000
51. Perry County levee districts 1, 2, and 3	1936	859,000	6,990,000
52. Jemez Canyon Reservoir	1948	7,201,000	7,201,000
53. Montour Falls	1941	478,000	1,715,000
54. Mount Morris Reservoir	1944	5,360,000	25,250,000
55. Olean	1946	2,282,400	3,570,000
56. Portville	1946	1,281,500	2,119,000
57. Buggs Island Reservoir	1944	30,900,000	88,840,000
58. Baldhill Reservoir	1944 and 1946	810,000	2,694,500
59. Garrison Reservoir	1944	105,000,000	268,000,000
60. West Fork of Mill Creek Reservoir	1946	1,527,000	3,441,700
61. Canton Reservoir	1938	7,800,000	10,562,000
62. Fort Gibson Reservoir	1941, 1944 and 1946	13,700,000	45,000,000
63. Oklahoma City floodway	1946	2,037,000	10,460,000
64. Detroit Reservoir	1938 to 1948	14,676,000	69,797,000
65. Dorena Reservoir	1938	3,490,000	14,281,000
66. Fern Ridge Reservoir	1938	2,538,000	4,507,700
67. Lookout Point Reservoir	1938 and 1950	24,026,000	88,230,000
68. Umpqua River and tributaries	1941	175,700	411,000
69. Conemaugh River Reservoir	1936 and 1938	21,366,000	47,500,000
70. Williamsport	1936 and 1948	1,880,000	15,000,000
71. York	1936 and 1938	2,000,000	5,100,000
72. Oahe Reservoir	1944	72,800,000	245,900,000
73. Belton Reservoir	1946	15,500,000	17,750,000
74. Benbrook Reservoir	1945	5,205,502	12,000,000
75. Fortworth floodway	1945	399,300	4,008,400
76. Hords Creek Reservoir	1941 and 1944	460,000	2,250,000
77. San Angelo Reservoir and floodway	1941 and 1944	6,800,000	16,200,000
78. Texarkana Reservoir	1946	20,300,000	33,000,000
79. Whitney Reservoir	1941 and 1944	10,150,000	42,043,900
80. Mud Mountain Reservoir	1936	3,206,000	13,221,000
81. Sutten Reservoir	1938	12,676,000	26,448,000
Subtotal of flood control		884,810,412	2,276,753,400
RIVER AND HARBOR			
82. Demopolis lock and dam	1945	6,750,000	20,843,000
83. Sacramento River (deep water channel)	1946	12,742,000	27,600,000
84. San Diego River and Mission Bay	1946	6,228,000	10,300,000
85. Mississippi River between Ohio and Missouri Rivers	1945	10,290,000	39,825,000
86. Cheatham lock and dam, Cumberland River	1946	7,150,000	14,000,000
87. St. Marys River, new power plant	1945	3,500,000	10,750,000
88. McNary lock and dam	1945	49,470,000	270,000,000
89. Schuylkill River above Fairmount Dam	1946	12,895,000	12,574,000
Subtotal of river and harbor		109,025,000	405,892,000
Total of the 89 projects		993,835,412	2,682,645,400

[1] On an additional 50 projects the corps did not require definite project reports, making the total 139 out of 182 projects for which the corps requested initial construction funds before completing definite project reports. The 50 additional projects are listed in a separate schedule.

EXHIBIT 4

50 projects in the 1951 Civil Works program (of 182 projects) for which the Corps of Engineers did not require definite project reports

Name of project	Authorization date	Authorization estimate	1952 fiscal year estimate
FLOOD CONTROL			
1. Sacramento River, major and minor tributaries	1944	$13,530,000	$28,000,000
2. Rosiclare	1948	500,000	635,000
3. Muskingum River Reservoirs	1938 to 1946	27,190,000	41,438,300
4. Willamette River (bank protection)	1936 to 1950	2,430,000	9,991,000
Subtotal of flood control		43,650,000	80,064,300
RIVER AND HARBOR			
5. Nome Harbor	1917 to 1948	2,201,450	2,044,100
6. Wrangell Narrows	1925 to 1945	500,000	4,300,000
7. Arkansas River and tributaries (part for which appropriations were requested).	1946 and 1950	374,313,000	686,370,000
8. Crescent City Harbor	1918 and 1945	2,607,000	7,150,000
9. Potomac River (north side, Washington channel)	1935	1,261,000	6,097,000
10. Jacksonville Harbor	1907 to 1945	11,217,000	12,044,400
11. Savannah Harbor	1874 to 1946	10,547,700	9,060,700
12. Illinois waterway	1927 to 1946	29,219,600	29,164,800
13. Mississippi River between Ohio and Missouri Rivers (regulating locks).	1881 to 1930	28,500,000	55,778,000
14. Mississippi River between the Missouri River and Minneapolis, exclude St. Anthonys Falls and lock 19.	1930 to 1950	122,506,139	173,108,600
15. Ohio River, lock and dam construction	1910 and 1918	66,826,500	120,222,100
16. Ohio River, open channel work	1827 to 1930	30,000	21,546,300
17. Missouri River, Kansas City to Sioux City	1927 and 1945	20,000,000	172,112,900
18. Calcasieu River and Pass	1937 to 1946	9,260,000	12,645,000
19. Gulf Intercoastal Waterway (New Orleans district)	1925 to 1946	24,772,000	31,075,500
20. Pearl River	1935	3,509,000	8,275,000
21. Waterway from Empire to Gulf of Mexico	1946	1,800,000	2,200,000
22. Portland Harbor	1836 to 1946	3,800,000	4,578,200
23. Baltimore Harbor and channels	1917 and 1945	6,565,000	10,400,000
24. Boston Harbor	1825 to 1946	19,668,920	18,790,000
25. Fall River Harbor	1930 and 1946	1,920,000	2,929,800
26. St. Marys River, navigation features	1870 to 1946	66,736,400	81,478,000
27. Missouri River, Kansas City to mouth	1912 to 1945	20,000,000	113,297,100
28. Fort Peck Dam	1935 to 1944	84,155,000	156,900,000
29. Newark Bay, Hackensack and Passaic Rivers	1907 to 1945	11,771,600	9,822,000
30. New York and New Jersey channels	1935 and 1950	27,000,000	53,141,000
31. Buffalo Harbor	1912 to 1945	7,478,800	16,146,000
32. Great Lakes to Hudson River waterway	1935 to 1945	27,000,000	28,500,000
33. Hudson River channel	1913 to 1937	6,272,500	7,074,000
34. New York Harbor—entrance channels and anchorage areas.	1884 to 1937	15,592,500	17,900,000
35. Cleveland Harbor	1896 to 1946	18,984,100	23,904,000
36. Lorain Harbor	1899 to 1945	2,457,350	2,761,000
37. Columbia River and tributaries	1935 to 1945	400,000	1,581,600
38. Bonneville lock and dam	1935 and 1937	40,200,000	84,046,000
39. Coos Bay	1910 to 1948	10,287,300	7,976,200
40. Locks 2, Monongahela River	1909	4,509,000	15,400,000
41. Georgetown Harbor	1945 and 1948	2,118,000	4,615,000
42. Houston Ship Channel	1905 to 1948	21,014,300	17,403,800
43. Gulf Intercoastal Waterway (Galveston)	1925 to 1950	21,704,400	29,222,500
44. Tampa Harbor 18	1899 to 1950	9,717,000	18,096,300
45. Sabine—Neches waterway	1912 to 1950	17,946,770	15,321,000
46. Trinity River, channel to Liberty	1945 and 1946	2,558,000	7,750,000
47. Norfolk Harbor	1884 to 1948	8,506,600	8,283,800
48. York Spit Channel	1905 to 1945	644,500	884,500
49. St. Thomas Harbor	1937	743,000	2,650,000
50. Grey's Harbor and Chehalis River	1896 to 1948	6,684,700	6,622,200
Subtotal of river and harbor		1,175,506,129	2,120,668,400
Total of the 50 projects		1,219,156,129	2,200,732,700

The total cost of these 139 projects, as estimated by the corps for fiscal year 1952, is $4.9 billion of the total cost estimates for the 182 projects which is $6 billion (both round figures).

It is also significant to note the corps' position that *definite project reports* were not necessary on 50 projects of the 139. Those 50

projects total $2,200,732,700 in cost, by the corps' estimate for fiscal year 1952. Since on these 50 projects the corps did not prepare *definite project reports*, the action by the Appropriations Committee could not have been predicated on completed planning, but rather on information supplied by the corps from *survey reports*, supplemented by subsequent general data. This unsatisfactory situation is also true of the other 89 projects, making a total of 139 projects on which the Appropriations Committee was not furnished the information vital to the exercise of its legislative function.

Survey reports and definite project studies,[19] being short of completed construction planning, provide inadequate cost estimates and other important data for consideration by the Appropriations Committee of requested initial construction funds.

The importance of the preparation of the *definite project report* prior to the time that initial construction funds are requested is also recognized by the corps in the manual which the corps prepared for study by young engineer officers at the Engineering School, Fort Belvoir, Va. This document is entitled "Civil Works Administration, Initiation of Projects" and was reviewed and revised by the Office of the Assistant Chief of Engineers for Civil Works in December 1949. The following quotation on page 8 of the document under the heading "Preparation of Definite Project Report" amply illustrates the importance of the *definite project report*:

> The Chief of Engineers assigns to the appropriate division and district engineer the responsibility for preparation of a definite project which serves as a basis for programing the planning and construction of the project report to establish definitely the most suitable plan for accomplishment of the project and provides a definite basis for final detailed plans and specifications. (See O. & R. 4214.01 to 4214.34.) This important step in the detailed planning of a project is taken in order to close the gap between the preliminary engineering design completed during the survey stage and the final engineering design necessary to initiate construction of the project. Due to the interval of time between surveys on a project and actual construction and the necessity for limiting expenditures during survey stage to the minimum necessary to furnish a conclusive answer on the general nature and justifiability of a project, the preparation of a definite project plan has been found to be an efficient procedure.

It is appropriate to consider the genesis and development of the *definite project report* procedure within the Corps of Engineers. However, before that is undertaken, it is of immediate interest to consider the tremendous increase in the cost of the civil works program attributable to conditions which better planning would probably have brought to light and minimized.

IV. The 124-Percent Increase in the Cost of the Civil Works Program

The 124-percent increase in the cost of this program, from $2.6 billion to $6 billion (round figures), is broken down as follows: The rise in construction costs accounts for 71.6 percent. Project extensions authorized by law account for another 21.8 percent. These two categories of increase will not be discussed further. However, there are four other categories of increase which amount in

[19] A term used by the corps to describe the preliminary and tentative stages of the *definite project report*.

dollars to $800,000,000, and represent 30.6 percent of the increase. These categories are the following:

1. Changes to meet local needs or situations.
2. Structural and engineering modifications.
3. Unforeseen conditions.
4. Inadequacies.

They are defined by the Corps of Engineers in the following document:

EXHIBIT 5

DEFINITIONS BY THE CORPS OF ENGINEERS OF CATEGORIES IN TABLE ENTITLED: "ANALYSIS BY THE CORPS OF ENGINEERS OF COST ESTIMATES FOR 182 CIVIL WORKS PROJECTS COMPRISING FISCAL YEAR 1951 PROGRAM"

(*a*) *Rise in price levels.*—Under this heading will be included the amount of the cost change which has been due to the rise in costs between the times when the estimates being compared were made. When modifications were made after construction was started and were affected by the rising cost indexes these will also be included, using an appropriate period of time. As a general rule appropriate rises in land costs were included in this category rather than in *d* below. The changes in estimated costs for the various projects due to rise in prices are price changes as nearly as we can estimate them which apply to the specific project. In many cases, however, the only guide to price increase was the general construction cost index.

(*b*) *Authorized project extensions.*—Under this heading will be included all increases in estimates which were due to extensions specifically authorized by Congress; and all increases in cost due to extensions authorized by general legislation, such as the addition of hydroelectric power units, the provision of facilities for reservoir management and public use and the inclusion of railroad relocations as a Federal responsibility by the 1938 Flood Control Act, when such items were not included in the estimate used as a basis for request of the first construction funds.

(*c*) *Changes to meet local needs and situations.*—Under this heading will be included changes in cost estimates resulting from modifications in project scope to meet new physical and economic conditions, and the obvious needs of local communities. Examples are as follows:

(1) Cities and towns have grown in many instances since authorization of original projects and it has been necessary to extend levees and flood walls to protect developed areas.

(2) Areas once largely agricultural have become urban or industrial, requiring a higher degree of protection.

(3) In the case of navigation projects changes such as provision of larger locks or better alignment have been included under this category when they have been necessary to meet growing requirements of waterborne commerce.

(*d*) *Lands, rights, and relocations.*—This item is included as a separate category because lands, rights, and relocations have in many projects been significant parts of the cost.

(*e*) *Engineering and construction modifications.*—Under this heading will be placed those changes in cost estimates which have resulted from changes in design found necessary; such as increasing spillway capacity, or of providing for higher criteria in levee design. It should be noted that most changes of this kind have resulted from increasing knowledge of engineering requirements for flood-control works and experience with their construction and operation. This growing experience could not have been reflected in the earlier estimates.

(*f*) *Unforeseen changes and conditions.*—Under this heading will be included changes in estimated costs due to factors which could not reasonably have been anticipated by capable engineers in preparing the first estimate on the basis of normal survey and investigational procedure; for example:

(1) It is not practicable or economical to have complete foundation investigations for survey report estimates. These cannot be provided fully until the construction stage is reached. Consequently it is unavoidable that unexpected and difficult foundation or subsurface conditions will be encountered in some cases.

(2) Reservoirs are laid out on the best maps available, checked to the extent possible by current surveys. Detailed surveys made in carrying out the project may show that the reservoir area will be larger, that certain

mineral rights may exist, or that additional road relocation will be necessary.

(g) *Inadequacy of original estimates.*—Under this heading will be placed any items of cost increase which were plainly due to inadequacy in the first estimate. These are items which were omitted, but should have been included by the estimator, as distinguished from those which could not have been foreseen. Also in this category will be placed differences due to estimates made under emergency conditions during the depression period or during the war.

If adequate planning had been completed for each of the 182 projects, subsequent to the submission of the *survey report* to Congress (upon which the authorization act was based), significant savings could have resulted. In addition, the Appropriations Committee would have been furnished by the Corps of Engineers considerably higher figures for the total construction cost for each of the projects and the committee would thus have been in a better position to determine whether or not the construction of individual projects should have been initiated. In this regard, it is of primary importance to consider the relationship of the benefit-cost ratio to the construction of civil works projects. Specifically by statute in the case of flood control projects, and by practice in the case of river and harbor projects, it has been the policy of Congress to permit the construction of such projects only if the benefits to the public exceed the annual cost to the Federal Government. (See act of June 22, 1936, ch. 688, sec. 1; 49 Stat. 1570; 33 U. S. C. 701a.) The Appropriations Committee did not have before it sound cost figures for many of these projects, computed as the result of planning subsequent to the *survey report*, and therefore the benefit-cost ratio which the committee considered was out of date. Consequently, the Appropriations Committee was hampered, if not thwarted, in exercising its important function—determining whether or not to permit the initiation of construction of individual projects. The only answer is careful planning after the project has been authorized on the basis of the *survey report*, by the completion of a more advanced *planning report* before the corps asks the committee for initial construction funds.

(a) *Importance of recomputation of benefit-cost ratio after the authorization of a project and before initial construction funds are requested*

The authorization of a project and the expenditure of Federal funds for its construction are not justified unless the benefit-cost ratio is favorable; that is, above unity (1–1 or higher). In many projects this ratio is no more than a shade above unity. In the case of 110 projects reported in hearings by the Corps of Engineers to the House Appropriations Subcommittee in April 1951, the ratio in at least 87 projects was between 1.0 to 1 and 1.9 to 1. In other words the justification for these projects, involving hundreds of millions of dollars, hung in delicate balance, directly dependent on the cost. These tables, appearing at pages 778–780 of the hearings, are as follows:

EXHIBIT No. 6

HEARINGS IN APRIL AND MAY 1951 BEFORE SUBCOMMITTEE ON ARMY CIVIL FUNCTIONS OF HOUSE APPROPRIATIONS COMMITTEE

(The following information was requested on p. 154:)

BENEFIT-TO-COST RATIO OF PROJECTS

RIVERS AND HARBORS

Construction, fiscal year 1952

Project	Total estimated cost	Benefit-to-cost ratio
Alabama:		
Apalachicola, Chattahoochee, and Flint Rivers:		
Jim Woodruff lock and dam, Florida	$42,208,000	1.13
Buford Dam, Ga	40,225,000	1.13
Demopolis lock and dam	20,843,000	1.07
Alaska: Wrangell Narrows	4,300,000	1.21
California: San Diego River and Mission Bay	10,300,000	2.40
Florida:		
Canaveral Harbor	3,276,000	1.30
Jacksonville to Miami waterway	24,131,000	(1) .69
Jacksonville Harbor	12,044,400	2.00
Georgia: Savannah Harbor	9,057,700	1.27
Illinois:		
Illinois waterway (exclusive of Calumet-Sag Channel)	29,164,800	4.06
Mississippi River between Ohio and Missouri Rivers: Chain of Rocks canal	39,825,000	(2)
Mississippi River between Missouri River and Minneapolis, Minn. (exclusive of St. Anthonys Falls, Minn., and Keokuk lock, Iowa)	173,108,300	1.22
Ohio River open channel work	21,546,300	1.50
Iowa: Missouri River from Kansas City, Mo., to Sioux City, Iowa	172,112,900	1.87
Louisiana:		
Calcasieu River and Pass	12,645,000	8.06
Gulf Intracoastal Waterway: Algiers cut-off	31,075,000	(2)
Pearl River, La. and Miss	8,274,700	1.07
Maryland: Baltimore Harbor and channels	10,400,000	2.32
Massachusetts: Fall River Harbor	2,929,800	2.00
Michigan: St. Marys River (power plant)	10,750,000	1.17
Minnesota: St. Anthonys Falls extension	20,477,700	(2)
Mississippi: Harrison County shore protection	1,133,000	2.05
Missouri: Missouri River, Kansas City, Mo., to mouth	113,297,100	1.87
Montana: Missouri River at Fort Peck	156,900,000	1.34
New Jersey:		
Newark Bay, Hackensack and Passaic Rivers	9,822,000	1.60
New York and New Jersey Channels	53,141,000	1.50
New York:		
Buffalo Harbor	16,146,000	1.20
Hudson River Channel	7,074,000	(2)
New York Harbor, entrance channels and anchorage areas	17,900,000	(2)
Ohio: Cleveland Harbor	23,904,000	1.14
Oregon:		
McNary Dam, Oreg. and Wash	270,000,000	1.12
The Dalles Dam, Oreg. and Wash	326,366,000	1.29
Pennsylvania:		
Monongahela River, Pa. and W. Va	65,140,000	3.30
Schuylkill River (culm removal)	12,574,000	1.63
Tennessee:		
Cumberland River, Ky. and Tenn.:		
Cheatham lock and dam, Tennessee	14,000,000	3.04
Old Hickory lock and dam, Tennessee	49,120,000	1.70
Texas:		
Houston ship channel	17,403,800	1.70
Gulf waterway (Colorado River locks)	29,222,500	1.50
Sabine-Neches waterway	15,320,500	4.90
Washington:		
Chief Joseph Dam	206,000,000	1.56
Ice Harbor lock and dam	95,899,000	1.30

[1] Benefit-cost ratio shown is for peacetime conditions in reach between St. Johns River and Cape Canaveral (Cocoa, Fla.). The project was authorized primarily to afford a protected inland waterway during wartime. The benefit-cost ratio shown would be multiplied many times in event that a protected route is again needed for water shipments on Atlantic seaboard.

[2] Not evaluated.

Construction, fiscal year 1952

Project	Total estimated cost	Benefit-to-cost ratio
Arkansas:		
Blakely Mountain Reservoir	$32,675,000	1.19
Bull Shoals Reservoir, Ark. and Mo	76,300,000	1.71
Narrows Reservoir	13,085,000	[1] 1.0
California:		
Cherry Valley Reservoir	8,000,000	1.1
Farmington Reservoir	3,729,000	1.2
Folsom Reservoir	50,792,000	1.2
Isabella Reservoir	19,050,000	1.9
Los Angeles County drainage area (exclusive of Whittier Narrows Reservoir)	301,605,600	2.05
Merced County stream group	2,700,000	1.4
Pine Flat Reservoir	51,121,000	2.0
San Antonio Reservoir	7,000,000	1.31
Whittier Narrows Reservoir	36,320,000	1.19
Connecticut: Mansfield Hollow Reservoir	7,550,000	1.1
Florida: Central and Southern Florida	58,129,000	2.23
Georgia: Clark Hill Reservoir, Ga. and S. C	78,400,000	1.88
Idaho:		
Albeni Falls Reservoir	31,070,000	2.65
Lucky Peak Reservoir	22,000,000	1.1
Illinois:		
East St. Louis and vicinity	12,092,000	9.78
Farm Creek reservoirs	10,384,500	2.68
Indiana: New Albany	6,200,000	1.2
Kansas:		
Kansas Citys, Mo. and Kans	41,389,000	2.74
Missouri River agricultural levees, Kansas, Missouri, Iowa, and Nebraska	124,837,000	[3] 1.6
Kentucky:		
Ashland	4,725,000	1.01
Covington	8,400,000	1.1
Dale Hollow Reservoir, Tenn. and Ky. (*See* Tennessee.)		
Hawesville	979,900	1.0
Louisville	25,700,000	2.2
Maysville	5,839,000	1.21
Wolf Creek Reservoir	82,700,000	2.02
Louisiana: Mermenatu River	5,000,000	1.33
Maryland: Cumberland, Md., and Ridgeley, W. Va	12,900,000	1.0
Massachusetts: Adams	4,600,000	1.16
Minnesota: Red River of the North, S. Dak., N. Dak., and Minn	11,548,400	1.37
Nebraska:		
Gavins Point Reservoir, S. Dak. and Nebr	44,900,000	1.1
Harlan County Reservoir	49,897,000	1.05
New Mexico: Jemez Canyon Reservoir	7,201,000	[1] 1.22
New York:		
Hoosick Falls	1,100,000	1.26
Mount Morris Reservoir	25,250,000	1.23
Olean	3,570,000	3.50
North Carolina: Buggs Island Reservoir, Va. and N. C	$88,840,000	1.34
North Dakota:		
Garrison Reservoir	268,000,000	1.2
Oahe Reservoir, S. Dak. and N. Dak. (*See* South Dakota.)		
Red River of the North, S. Dak., N. Dak. and Minn. (*See* Minnesota.)		
Ohio: Muskingum River reservoirs	41,438,300	1.9
Oklahoma:		
Denison Reservoir, Tex. and Okla	61,630,000	1.22
Fort Gibson Reservoir	45,000,000	[2] 1.15
Tenkiller Ferry Reservoir	21,750,000	1.09
Oregon:		
Detroit Reservoir	69,797,000	1.01
Lookout Point Reservoir	88,230,000	1.16
Willamette River Basin (bank protection)	9,991,000	1.4
Pennsylvania:		
Conemaugh River Reservoir	47,500,000	2.4
East Branch Clarion River Reservoir	9,612,000	1.27
Williamsport	15,000,000	2.5
South Carolina: Clark Hill Reservoir, Ga. and S. C. (*See* Georgia.)		
South Dakota:		
Fall River Basin	4,479,000	1.45
Fort Randal Reservoir	189,200,000	1.5
Gavins Point Reservoir, S. Dak. and Nebr. (*See* Nebraska.)		
Oahe Reservoir, S. Dak. and N. Dak	245,900,000	1.4
Red River of the North, S. Dak., N. Dak., and Minn. (*See* Minnesota.)		
Tennessee:		
Center Hill Reservoir	45,700,000	1.89
Dale Hollow Reservoir, Tenn. and Ky	26,000,000	1.55
Memphis, Wolf River and Nonconnah Creek	13,430,000	1.1
Texas:		
Belton Reservoir	17,750,000	1.64
Benbrook Reservoir	12,000,000	[3] 1.56
Denison Reservoir, Tex. and Okla. (*See* Oklahoma.)		
Fort Worth floodway	4,008,400	[3] 1.56
Garza-Little Elm Reservoir	23,321,900	1.64
Lavon Reservoir	12,000,000	1.34
San Angelo Reservoir and Floodway	16,200,000	1.28
Texarkana Reservoir	33,000,000	1.12
Whitney Reservoir	42,043,900	1.15
Virginia:		
Buggs Island Reservoir, Va. and N. C. (*See* North Carolina.)		
Philpott Reservoir	13,120,000	1.07

[1] For basin plan. Annual cost and benefits not computed for separate units at this time.
[2] For 3-reservoir plan.
[3] For basin plan for flood control.

Hearings in April and May 1951 Before Subcommittee on Army Civil Functions of House Appropriations Committee

(The following information was requested on p. 154:)

Benefit-to-Cost Ratio of Planning Projects

RIVERS AND HARBORS

Planning, fiscal year 1952

Project	Total estimated cost	Benefit-to-cost ratio
Alabama:		
Alabama-Coosa Rivers, Ala. and Ga.: Howell Mill Shoals Dam, Ala.	$91,600,000	1.16
Tennessee-Tombigbee waterway, Alabama and Mississippi	179,264,000	1.06
Arkansas: Arkansas River and tributaries, Arkansas and Oklahoma	686,370,000	1.07
Kentucky:		
Ohio River locks and dams:		
Fernbank lock and dam	52,540,000	1.30
Greenup lock and dam	46,550,000	1.30
Cumberland River, Ky. and Tenn.: Lower Cumberland locks and dam	130,000,000	1.70
Ohio: Ohio River locks and dam: New Cumberland lock and dam	39,352,500	1.20
Tennessee: Cumberland River, Ky. and Tenn.: Carthage Dam	37,240,000	1.60
Texas: Neches-Angelina Rivers: McGee Bend Dam	39,720,000	1.36

Although a project is authorized on this basis, subsequent detailed planning of the project may disclose that the favorable ratio was nonexistent and the result of undue optimism on the part of the corps. It is therefore in the public interest that the ratio be reevaluated after detailed planning has been completed. General Pick and Colonel Potter recognized this in their testimony of April 3, 1951, as follows:

Colonel Potter. If I may add one sentence there, after the definite project report is completed, we then again analyze the economics of the project and, if it is uneconomical based on that estimate, we do not come in for construction funds. And that has happened.

General Pick. In other words, if it is going to cost too much and we do not have a favorable economic ratio, we just defer the project.

But this reevaluation was not available to Congress in at least 139 of the 182 current projects (which were listed above) at the time that the corps asked for initial construction funds.

(*b*) *Detailed breakdown by categories of the 124 percent cost increase*

The cost increase between (1) the cost estimates furnished to Congress at the time each of the 182 projects was authorized, and (2) the cost estimates for fiscal year 1952, is $3,273,933,000. This figure is broken down into the following categories:

		Percent of authorization estimate	
Price changes	$1,887,911,000	71.6	
Authorized project extensions	576,814,000	21.8	
Changed local needs or situations	134,515,000	5.1	30.6
Structural and engineering modifications	206,194,000	7.8	
Unforeseen conditions	279,524,000	10.6	
Inadequacy	188,975,000	7.1	
Total cost increase	3,273,933,000	124	

The category of *inadequacy* is simply defined as omissions in planning and estimating. *Unforeseen conditions* are generally those conditions about which more accurate information could have been obtained by more careful planning subsequent to the *survey report* which, in its very nature, is not designed to develop such information fully. *Structural* and *engineering modifications* are obviously the result of engineering planning. If the planning had been developed beyond the stage of the *survey report* before initial construction funds were requested, such modifications could have been considered and this Committee furnished adequate data regarding the cost of modifications and their effect on the project as a whole. *Changed local conditions* are inevitable since the country is dynamically expanding year by year. Consequently, the estimate for local needs in the *survey report* is several years old, and thoroughly out of date, at the time that the corps requests the Appropriations Committee for initial construction funds for projects.

Greater certainty should be achieved in these categories of cost increase through better planning, and the Appropriations Committee thereby furnished sound and current data upon which to decide the question of whether funds for the initiation of construction shall be appropriated.

The following table shows that in the case of *inadequacy*, there were omissions in engineering planning over 10 percent in 48 of the 182 projects:

EXHIBIT 7

Inadequacies to indicate extent of increase over 10 percent for 1951 program (48 of 182 projects)[1]

Name of project	Authorization date	Authorization estimate	Amount of increase between authorization estimate and 1952 fiscal year estimate due to inadequacies	Percent of increase over authorization estimate
1. Missouri River—Sioux City	1927 and 1945	$20,000,000	$43,475,000	217.3
2. Lavon Reservoir	1945	3,733,000	4,082,800	109.3
3. Farm Creek Reservoir	1944	3,017,900	3,379,800	108.6
4. Jim Woodruff Reservoir	1945 and 1946	2,799,000	2,800,000	100.0
5. Dorena Reservoir	1938	3,490,000	3,426,000	98.1
6. Columbia River tributary	1935 and 1945	400,000	390,000	97.5
7. Fort Worth floodway	1945	399,300	355,400	88.9
8. Degonia-Fountain Bluff	1936	330,000	277,750	83.9
9. East St. Louis and vicinity	1936	1,158,000	905,000	78.1
10. Fall River Basin	1941	1,050,000	772,400	73.5
11. Detroit Reservoir	1938	14,676,000	10,170,000	69.3
12. Williamsport flood project	1936 and 1948	1,880,000	1,269,900	67.4
13. Baldhill Reservoir	1944 to1946	810,000	457,320	56.4
14. Buford Reservoir	1946	17,631,000	9,820,000	55.7
15. Miller Pond district	1938	28,000	15,000	53.5
16. Isabella Reservoir	1944	6,800,000	3,560,000	52.3
17. Sacramento River, ship channel	1946	12,742,000	6,565,000	51.5
18. Pine Flat Reservoir	1944	19,700,000	9,329,000	47.3
19. St. Mary's River	1945	3,500,000	1,700,000	45.7
20. Garza-Little Elm	1945	5,471,987	2,258,327	41.2
21. Wood River district	1938	750,000	300,000	40.0
22. Red Lake and Clearwater Rivers	1944	902,940	350,068	38.7
23. McNary Lock-Dam	1945	49,470,000	18,373,000	37.1
24. Massillon project	1938	2,988,000	946,300	35.0
25. Reconstruction of locks 2	1909	4,509,000	1,371,700	30.4
26. Newport project	1937	1,411,000	426,000	30.1
27. Hulah Reservoir	1936	2,343,000	654,000	27.9
28. St. Thomas Harbor	1937	743,000	192,825	25.9
29. Blakely Mountain Dam	1944	11,080,000	2,814,000	25.4
30. Oahe Reservoir	1944	72,800,000	17,760,000	24.5
31. Mill Creek Reservoir	1946	1,527,000	360,000	23.5
32. Hornell project	1938	1,418,700	308,600	21.7
33. Wichita-Valley Center project	1936	2,603,100	551,000	21.1
34. Mud Mountain Dam	1936	3,206,000	671,000	20.9
35. York flood project	1936 and 1938	2,000,000	412,200	20.6
36. Chouteau-Nameoke Venice levee	1936	132,000	25,000	18.1
37. Coralville Reservoir	1938	4,999,000	946,000	18.1
38. Dewey Reservoir	1938	3,940,000	727,200	18.1
39. Garrison Reservoir	1944	105,000,000	17,894,000	17.0
40. Umpqua River project	1941	175,000	30,000	17.0
41. Buffalo Harbor	1912	7,478,800	1,257,900	16.8
42. Crescent City Harbor	1918 and 1945	2,607,000	412,000	15.8
43. Folsom Reservoir	1944	18,474,000	2,581,000	13.9
44. Farmington Reservoir	1944	1,616,200	205,000	12.6
45. Perry County districts 1, 2, and 3	1936	859,000	100,000	11.6
46. Lorain Harbor	1899	2,457,350	283,650	11.5
47. Demopolis Reservoir	1945	6,750,000	750,000	11.1
48. Sunbury flood project	1936 and 1941	1,900,000	203,000	10.6
Total		433,756,277	175,914,140	

[1] The Corps of Engineers has explained the cost increases included in this category as follows:
"Under this heading will be placed any items of cost increase which were plainly due to inadequacy in the first estimate. These are items which were omitted, but should have been included by the estimator, as distinguished from those which could not have been foreseen. Also in this category will be placed differences due to estimates made under emergency conditions during the depression period or during the war.'

The table shows that for these 48 projects the miscalculation runs from 217.3 percent down to 10.6 percent, totaling $175,914,140. In dollars, the increase for all the 182 projects between the authorization estimate and the estimate for fiscal year 1952 attributable to *inadequacy* is $188,975,000.

The following table shows similar facts with respect to the increase for *unforeseen conditions:*

EXHIBIT 8

Unforeseen conditions to indicate extent of increase over 10 percent for 1951 program (70 of 182 projects) [1]

Name of project	Authorization date	Authorization estimate	Amount of increase between authorization estimate and 1952 fiscal year estimate due to unforeseen conditions	Percent of increase over authorization estimate
1. Wood River district	1938	$750,000	$3,767,000	502.2
2. Grand Tower district	1938	320,000	1,244,000	388.7
3. Degognia-Ftn. bluff	1936	330,000	1,105,700	334.8
4. Fort Worth floodway	1945	399,300	1,095,455	274.4
5. Perry County 1-2-3	1936	859,000	2,179,000	253.5
6. Mud Mountain Dam	1936	3,206,000	7,545,000	235.3
7. East St. Louis and vicinity	1936	1,158,000	2,560,500	221.2
8. Missouri River, Kansas City to mouth	1912	20,000,000	38,266,000	191.6
9. Newport project	1937	1,411,000	2,400,000	170.1
10. Garza-Little Elm	1945	5,471,987	7,538,451	137.7
11. Miller Pond	1938	28,000	37,000	135.7
12. Columbia levee district	1936	546,000	670,000	122.6
13. St. Thomas Harbor	1937	743,000	776,775	104.4
14. Columbia River tributary	1935 and 1945	400,000	373,400	93.2
15. Missouri River, Sioux City	1927 and 1945	20,000,000	18,603,070	93.0
16. Dillon Reservoir	1938	6,847,800	6,007,060	87.7
17. Red Lake and Clearwater	1944	902,940	773,568	85.7
18. Hutchenson, Ark	1936	1,050,000	879,100	83.7
19. Mount Morris Reservoir	1944	5,360,000	4,033,100	75.3
20. Dorena Reservoir	1938	3,490,000	2,724,000	78.0
21. Jim Woodruff	1945 and 1946	2,799,000	1,994,000	71.2
22. Hulah Reservoir	1936	2,343,000	1,639,800	69.9
23. Fern Ridge Reservoir	1938	2,538,000	1,673,000	65.9
24. East Cape Girardeau	1936	395,000	260,300	65.8
25. Mill Creek Reservoir	1946	1,527,000	1,000,000	65.4
26. Oologah Reservoir	1936 and 1946	8,345,000	4,600,000	55.1
27. Detroit Reservoir	1938	14,676,000	7,075,000	48.8
28. Cresent City Harbor	1918 and 1945	2,607,000	1,254,500	48.1
29. Pine Flat Reservoir	1944	19,700,000	9,382,000	47.6
30. Cherry Valley Reservoir	1944	3,827,000	1,718,000	44.9
31. Baldhill Reservoir	1944 and 1946	810,000	353,770	42.3
32. Washington Channel	1935	1,261,000	547,900	42.6
33. Kansas Citys	1936 and 1944	10,000,000	4,186,870	41.8
34. York flood project	1936 and 1938	2,000,000	807,900	40.3
35. Bayou Teche—Vermillion	1941	1,390,000	555,000	39.9
36. Fort Gibson	1941, 1944, and 1946	13,700,000	5,465,000	39.8
37. Hoosick Falls	1936 and 1941	137,000	52,000	37.9
38. Galena project	1944	418,000	155,230	37.0
39. Farmington Reservoir	1944	1,616,200	567,000	34.4
40. Wister Reservoir	1938	6,560,000	2,174,700	33.1
41. Heyburn Reservoir	1946	1,838,500	608,700	33.0
42. Mississippi River between Ohio and Missouri Rivers, Chain of Rocks canal.	1945	10,290,000	3,370,000	32.7
43. Mississippi River between Ohio and Missouri.	1930	28,500,000	8,125,000	28.5
44. Isabella Reservoir	1944	6,800,000	1,913,000	28.1
45. Oahe Reservoir	1944	72,800,000	18,759,000	25.7
46. Umpqua River	1941	175,700	45,630	25.6
47. Cagles Mill	1938	1,478,000	350,000	23.6
48. York Spit channel	1945 and prior	644,500	145,000	22.3
49. Williamsport flood project	1936 and 1948	1,880,000	406,000	21.6
50. Georgetown Harbor	1945	2,118,000	450,000	21.2
51. Conemaugh Reservoir	1936 and 1938	21,366,000	4,406,900	20.5
52. Fall River Basin	1941	1,050,000	211,000	20.0
53. St. Marys River	1945	3,500,000	700,000	20.0
54. Kee levee, Arkansas River	1936	32,500	6,400	19.6
55. Blakely Mountain Dam	1944	11,080,000	2,087,000	18.8
56. Fort Peck Dam	1933, 1935, 1944	84,155,000	15,126,000	17.9
57. Fort Randall	1944	75,000,000	13,114,500	17.4
58. North Adams	1936 and 1941	1,471,000	256,000	17.4
59. Hornell project	1938	1,418,700	237,500	16.7
60. Denison Reservoir	1938	54,000,000	8,391,700	15.5
61. Lookout Point	1938	24,026,000	3,617,000	15.0
62. San Diego River	1946	6,228,000	922,000	14.8
63. Reconstruction of locks 2	1909	4,509,000	661,700	14.6
64. Mansfield Hollow	1941	3,090,000	450,800	14.5

See footnote at end of table, p. 103.

Unforeseen conditions to indicate extent of increase over 10 percent for 1951 program (70 of 182 projects) [1]—Continued

Name of project	Authorization date	Authorization estimate	Amount of increase between authorization estimate and 1952 fiscal year estimate due to unforeseen conditions	Percent of increase over authorization estimate
65. New York Harbor	1884 and 1937	$15,592,000	$2,140,750	13.7
66. Texarkana	1946	20,300,000	2,700,000	13.3
67. Folsom Reservoir	1944	18,474,000	2,373,000	12.7
68. Bonneville Dam	1933 and 1937	40,200,000	4,823,000	11.9
69. Lawrenceburg	1938	2,291,000	260,000	11.7
70. Harlan County Reservoir	1938 and 1944	20,078,098	2,236,200	11.1
Total		704,308,225	246,942,939	

[1] The Corps of Engineers explained the cost increases included in this category as follows:

"Under this heading will be included changes in estimated costs due to factors which could not reasonably have been anticipated by capable engineers in preparing the first estimate on the basis of normal survey and investigational procedure; for example:

"(1) It is not practicable or economical to have complete foundation investigations for survey report estimates. These cannot be provided fully until the construction stage is reached. Consequently it is unavoidable that unexpected and difficult foundation or subsurface conditions will be encountered in some cases.

"(2) Reservoirs are laid out on the best maps available, checked to the extent possible by current surveys. Detailed surveys made in carrying out the project may show that the reservoir area will be larger, that certain mineral rights may exist, or that additional road relocation will be necessary."

The engineering planning at the time of the authorization estimate failed to take into account *unforeseen conditions* in excess of 10 percent on 70 of the 182 projects. Percentages run from 502.2 percent down to 11.1 percent, a total in dollars of $246,942,939. The total for the 182 projects is $279,524,000.

Still another table shows that 63 of the 182 projects were increased in cost by $226,638,209 by virtue of *structural* and *engineering modifications*. The percentage of increase for this item in those projects where it exceeded 10 percent shows that the increase for these modifications runs from 726.9 to 10.6 percent. The table is as follows:

EXHIBIT 9

Structural and engineering modifications to indicate extent of increases over 10 percent for 1951 program (63 of 182 projects are listed)

Name of project	Authorization estimate	Amount of increase between authorization estimate and fiscal year 1952 estimate due to structural and engineering modifications	Percent of increase over authorization estimate
1. Adams project	$271,000	$1,970,000	726.9
2. Wood River district	750,000	3,138,000	418.7
3. East St. Louis and vicinity	1,158,000	3,973,000	343.1
4. Great Salt Plains Reservoir	972,000	3,188,000	327.9
5. North Adams project	1,471,000	4,754,900	323.2
6. Hoosick Falls project	137,000	428,000	312.4
7. Grand Tower district	320,000	932,000	291.3
8. Wichita-Valley Center project	2,603,100	6,513,000	234.6
9. Hords Creek Reservoir	460,000	1,048,200	228.3
10. Hulah Reservoir, Caney River	2,343,000	4,741,400	202.3
11. Jim Woodruff Reservoir	2,799,000	5,193,000	185.7
12. Missouri River at Sioux City	20,000,000	37,109,830	185.5
13. Kaw River levee project, Arkansas River	32,500	33,000	163.1
14. Fort Worth floodway	399,300	650,157	162.8
15. Williamsport flood project	1,880,000	2,379,200	126.6
16. Cagles Mill Reservoir	1,478,000	1,742,000	117.9
17. Montour Falls project	478,000	529,600	110.8
18. Mississippi River between Ohio and Missouri Rivers	10,290,000	10,286,000	100.0
19. Mount Morris Reservoir	5,360,000	5,214,700	97.3
20. Demopolis Reservoir	6,750,000	6,233,000	90.8
21. Fall River Basin project	1,050,000	932,200	88.6
22. San Angelo Reservoir	6,800,000	5,915,000	87.1
23. Hutchinson project, Arkansas River	1,050,000	884,200	83.8
24. Coralville Reservoir	4,999,000	3,463,500	71.4
25. Missouri River, Kansas City to mouth	20,000,000	10,531,100	52.5
26. Perry County districts Nos. 1, 2, and 3	859,000	450,000	52.4
27. Hornell project	1,418,700	711,100	50.1
28. Benbrook Reservoir	5,205,502	2,507,108	48.1
29. Oklahoma City floodway	2,037,000	889,000	43.6
30. Crescent City Harbor	2,607,000	1,131,500	43.3
31. Baltimore Harbor	6,565,000	2,688,000	40.9
32. East Cape Girardeau, Clear Creek	395,000	160,000	40.5
33. Dorena Reservoir	3,490,000	1,409,000	40.4
34. Louisville project	4,500,000	1,750,000	38.8
35. Sunbury flood project	1,900,000	732,000	38.4
36. Fort Gibson Reservoir	13,700,000	5,033,300	36.7
37. McNary lock and dam	49,470,000	17,511,000	35.4
38. Galena project	418,000	147,700	35.3
39. Bull Shoals Reservoir	42,000,000	14,801,800	35.2
40. Buford Reservoir	17,631,000	5,753,000	32.9
41. Mud Mountain Dam	3,206,000	1,035,000	32.4
42. Covington project	2,188,000	700,000	32.1
43. Red Lake and Clearwater Rivers	902,940	284,090	31.6
44. Nimrod Reservoir	2,888,000	876,400	30.4
45. Massillon project	2,988,000	893,700	29.5
46. Blakely Mountain Dam	11,080,000	3,152,000	28.4
47. Maysville project	1,820,000	510,000	28.3
48. Conemaugh Reservoir	21,366,000	5,313,000	24.9
49. East Branch, Clarion Reservoir	5,525,900	1,355,000	24.6
50. Farmington Reservoir	1,616,200	384,000	23.5
51. Philpott Reservoir	5,240,000	1,105,000	21.2
52. Buggs Island Reservoir	30,900,000	6,260,000	20.3
53. Merced County project	1,300,000	244,000	18.8
54. Columbia River tributaries	400,000	75,000	18.8
55. Garza-Little Elm project	5,471,987	960,576	17.6
56. Lavon Reservoir	3,733,000	579,257	15.6
57. Lookout Point Reservoir	24,026,000	3,513,000	14.6
58. Dillon Reservoir	6,847,800	985,000	14.5
59. Fort Peck Dam	84,155,000	11,450,000	13.6
60. Cherry Valley Reservoir	3,827,000	514,000	13.4
61. San Diego River-Mission Bay	6,228,000	819,000	13.2
62. Grapevine Reservoir	3,973,200	480,691	12.1
63. Oahe Reservoir	72,800,000	7,692,000	10.6
Total	548,530,129	226,638,209	

Other large increases in the cost of the 182 projects is attributable to underestimating in the matter of *relocations* and the matter of *land acquisition*. The following table shows that of those projects requiring *relocations* and *land acquisition*, the increase in cost for *relocations* is 177 percent, and the increase in cost for *lands* is 123 percent and 42 percent in acreage:

Exhibit 10

Data on relocations and lands for 182 projects comprising fiscal year 1951 program

[Only those projects in fiscal year 1951 program, which involve relocations and land acquisitions are listed]

Projects	Relocations					Lands						
	Authorization estimate		Fiscal year 1952 estimate			Authorization estimate		Fiscal year 1952 estimate				
	Date of authorization	Estimate of relocation cost	Estimate of relocation cost	Percent increase over authorization estimate	Percent of completion of relocation program	Estimate of land cost	Number of acres	Estimate of land cost	Number of acres	Percentage of increase over authorization estimate		Percent of completion of land acquisition program
										Cost	Acreage	
FLOOD-CONTROL PROJECTS												
Tucson diversion channel	1948	$318,000	$318,000	0	0	0	0	0	0			
Blakely Mountain Dam	1944	195,000	715,000	267	1	$768,000	36,700	$3,800,000	88,952	395	142	7
Bulls Shoals Reservoir	1941	158,000	5,524,000	3,396	1	1,565,000	40,000	4,641,000	101,275	197	153	44
Narrows Reservoir	1941 and 1944	350,000	630,000	80	83	238,000	12,555	640,000	16,168	169	29	73
Nimrod Reservoir	1938	313,000	322,700	3	100	650,000	18,000	654,500	24,793	1	38	99
Norfork Reservoir	1938 and 1941	238,000	1,572,600	446	100	875,000	14,000	1,191,900	49,154	36	251	100
Cherry Valley Reservoir	1944	474,000	625,000	32	(1)	340,000	(1)	128,000	(1)	−62	(1)	(1)
Farmington Reservoir	1944	117,000	285,000	144	0	257,700	5,300	385,000	5,450	49	3	9
Folsom Reservoir	1944	511,000	4,580,000	796	1	645,000	7,400	2,385,000	19,700	270	166	16
Isabella Reservoir	1944	1,163,000	6,950,000	498	1	1,578,000	14,440	3,744,000	17,800	137	23	29
Los Angeles County drainage area	1936–38, 1941	[2] 0	18,600,600		(3)	0	0	7,175,000	1,200			90
Pine Flat Reservoir	1944	507,000	4,132,000	715	37	364,000	15,000	715,000	15,000	96	0	63
Whittier Narrows Basin	1941	500,000	8,775,000	1,655	2	7,503,000	3,103	14,645,000	2,700	95	−13	23
Mansfield Hollow Reservoir	1941	236,600	1,508,000	537	0	270,400	2,200	827,000	2,217	206	1	30
Clark Hill Reservoir	1944	1,809,000	5,400,000	198	50	1,354,500	86,500	5,498,000	169,295	306	96	68
Lucky Peak Reservoir	1946	1,891,000	6,907,000	265	0	236,000	3,483	415,000	7,557	76	117	10
Columbia levee district	1936	0	401,800		48	0	0	0	0			
Degognia-Fountain Bluff district	1936	0	465,000		1	0	0	0	0			
East St. Louis and vicinity	1936	0	2,070,500		0	0	0	0	0			
Farm Creek Reservoir	1944	1,200,000	2,662,770	122	87	216,800	934	425,110	1,184	96	27	91
Galena project	1941	31,000	18,000	−42	100	0	0	0	0			
Grand Tower district	1938	0	194,200		0	0	0	0	0			
Prairie du Rocher	1938	72,500	138,500	91	0	0	0	0	0			
Wood River district	1938	0	1,649,000		0	0	0	0	0			
Cagles Mill Reservoir	1938	77,000	857,000	1,013	0	378,000	3,000	750,000	7,300	98	143	63
Coralville Reservoir	1938	340,000	4,462,000	1,212	0	1,410,000	22,500	5,604,000	34,700	297	54	11
Fall River Reservoir	1941	166,000	249,030	50	100	754,000	10,650	1,765,210	15,160	134	42	100

Fall River Reservoir	1941	166,000	249,030	50	100	754,000	10,650	1,765,210	15,160	134	42	100
Hutchinson project, Arkansas River	1936	492,000	2,974,000	504	0	0	0	0	0			
Kansas City	1936 and 1944	0	2,403,803		100	0	0	165,000	426			99
Wichita-Valley Center project	1936	1,133,800	4,528,000	299	0	0	0	0	0			
Dewey Reservoir	1938	940,000	815,300	−13	100	1,450,000	3,450	2,394,800	13,335	65	287	76
Wolf Creek Reservoir	1938	7,160,000	10,453,800	46	64	4,340,000	56,830	10,460,000	96,000	141	69	86
Bayou Teche-Vermilion River	1941	200,000	322,000	61	98	0	0	0	0			
Cumberland, Md.-Ridgeley	1936 and 1946	0	0			172,000	98	363,400	98	111	0	0
Knightville Reservoir	1938 and 1941	475,000	636,000	34	100	101,000	1,800	228,000	2,679	126	49	100
Red Run project, Clinton River	1948	325,000	345,000	6	0	0	0	0	0			
Red Lake and Clearwater Rivers	1944	28,680	325,230	1,034	3	0	0	0	0			
Red River of the North project	1948	180,700	19,700	−89	0	113,385	1,460	212,200	2,300	87	58	0
Perry County districts 1, 2, 3	1936	0	374,100		0	0	0	0	0			
Harlan County Reservoir	1938, 1941, and 1944:	3,213,860	11,940,304	272	56	1,137,500	35,000	4,779,000	33,100	320	−5	38
Jemez Canyon project	1948	0	0			6,200	3,500	13,440	6,700	117	91	0
Hornell project	1938	0	357,900		99	0	0	466,800	345			43
Montour Falls project	1941	88,000	436,700	396	100	0	0	0	0			
Mount Morris project	1944	0	181,000		40	271,000	3,300	446,500	4,268	65	29	25
Olean flood project	1946	52,900	5,800	−89	24	0	0	0	0			
Portville flood project	1946	43,800	0			0	0	0	0			
Buggs Island Reservoir	1944	6,500,000	12,550,000	93	7	4,350,000	88,000	8,960,000	115,000	106	31	64
Baldhill Reservoir	1944 and 1946	0	35,000		0	208,000	6,000	633,400	8,000	205	33	87
Garrison Reservoir	1944	10,600,000	26,960,000	154	3	6,100,000	480,000	16,840,000	480,000	176	0	64
Dillon Reservoir	1938	3,908,300	11,476,600	194	54	1,358,500	11,600	4,817,000	14,470	255	25	15
Massillon project	1938	1,392,000	3,892,100	180	63	390,000	160	496,200	284	27	77	93
Muskingum Reservoirs	1939	9,164,000	12,595,400	37	99	1,600,000	145,481	9,584,200	146,382	499	1	83
Mill Creek Reservoir	1946	370,000	1,335,000	261	45	0	0	570,000	1,425			80
Canton Reservoir	1938	0	66,330		100	0	0	645,150	19,880			100
Denison Reservoir Red River	1938	4,780,100	11,315,800	137	100	8,000,000	236,322	11,822,600	195,440	48	−17	99
Fort Gibson Reservoir	1941, 1944, and 1946.	1,367,500	9,407,500	588	27	1,730,000	34,600	4,080,000	77,700	136	125	89
Great Salt Plains Reservoir	1936	0	194,000		100	0	0	270,000	31,930			100
Hulah Reservoir Caney River	1936	123,600	931,000	653	9	1,018,000	17,300	2,474,800	21,530	143	24	96
Kaw levee project Arkansas River	1936	0	10,000		0	0	0	0	0			
Oklahoma City floodway	1946	1,089,000	2,100,000	93	0	0	0	0	0			
Oologah Reservoir	1938 and 1946	375,000	7,260,000	1,836	0	3,225,000	38,400	8,050,000	75,200	150	96	4
Heyburn Reservoir	1946	121,000	212,500	76	56	165,000	4,000	387,000	7,320	135	83	100
Tenkiller Ferry Reservoir	1938 and 1946	606,250	1,983,500	227	0	893,750	15,600	1,569,000	31,900	75	104	72
Wister Reservoir	1938	660,000	1,586,521	140	97	1,540,000	33,000	1,187,536	39,150	−23	19	100
Detroit Reservoir	1938	2,272,000	6,904,000	204	75	243,000	3,640	1,191,000	7,661	390	105	17
Dorena Reservoir	1938	406,000	2,040,000	402	99	280,000	1,970	602,000	2,966	115	51	99
Fern Ridge Reservoir	1938	758,000	228,000	−70	100	653,000	11,670	829,000	12,661	27	8	99
Lookout Point Reservoir	1938	12,280,000	23,444,000	91	30	1,258,000	5,230	1,826,000	9,667	45	85	20
Conemaugh Reservoir	1936 and 1938	12,806,000	27,890,200	118	66	2,872,000	6,800	5,253,000	7,150	83	5	24
East Branch Clarion Reservoir	1938 and 1944	3,600	5,250	46	0	80,600	1,355	240,450	2,072	200	55	59
Sunbury flood project	1936 and 1941	0	184,000		100	0	0	0	0			
Williamsport flood project	1936 and 1948	0	731,000		99	0	0	0	0			
York flood project	1936 and 1938	0	117,000		100	0	0	532,000	1,958			98
Fort Randall Reservoir	1944	4,943,500	19,635,000	287	4	1,516,000	96,500	5,712,000	115,830	277	20	23

See footnotes at end of table, p. 109.

Data on relocations and lands for 182 projects comprising fiscal year 1951 program—Continued

[Only those projects in fiscal year 1951 program, which involve relocations and land acquisitions are listed]

Projects	Relocations					Lands						
	Authorization estimate		Fiscal year 1952 estimate			Authorization estimate		Fiscal year 1952 estimate				
	Date of authorization	Estimate of relocation cost	Estimate of relocation cost	Percent increase over authorization estimate	Percent of completion of relocation program	Estimate of land cost	Number of acres	Estimate of land cost	Number of acres	Percentage of increase over authorization estimate		Percent of completion of land acquisition program
										Cost	Acreage	
FLOOD CONTROL PROJECTS—continued												
Fall River Basin project	1941	0	$36,987		0	$5,000	315	$71,000	952	1,320	202	0
Oahe Reservoir	1944	$14,929,000	41,820,000	180	0	6,450,000	(2)	17,120,000	342,400	165	(2)	1.5
Center Hill Reservoir	1938	1,550,000	3,069,000	98	84	2,750,000	22,770	3,712,000	38,659	35	70	91
Belton Reservoir	1946	775,000	2,956,000	281	0	1,949,000	29,800	2,720,000	33,000	40	11	4
Benbrook Reservoir	1945	35,992	1,778,000	4,839	3	483,600	6,200	2,516,700	13,448	420	117	87
Fort Worth floodway	1945	0	1,042,600		0	0	0	0	0			
Garza-Little Elm project	1945	293,431	3,082,300	952	1	999,830	18,150	4,930,000	64,937	393	258	11
Grapevine Reservoir	1945	158,424	1,733,055	994	3	513,624	11,380	2,522,639	18,775	391	65	35
Hords Creek Reservoir	1941 and 1944	0	0			37,700	1,180	208,000	3,027	452	157	94
Lavon Reservoir	1945	754,000	2,170,400	188	4	1,012,570	15,580	2,908,600	25,718	187	65	72
San Angelo Reservoir	1941 and 1944	120,000	1,167,600	873	22	503,600	13,600	3,485,900	19,700	592	45	27
Texarkana Reservoir	1946	3,200,000	8,000,000	150	5	1,900,000	104,000	3,700,000	155,100	95	49	13
Whitney Reservoir	1941 and 1944	937,120	10,242,200	993	25	840,000	28,200	3,901,000	54,816	364	94	68
Philpott Reservoir	1944	80,000	330,000	312	0	140,000	4,300	490,000	9,400	250	119	9
Mud Mountain Dam	1936	0	0			29,000	1,200	24,000	2,372	−17	98	100
Sutton Reservoir	1938	7,122,000	6,224,000	−13	0	1,437,000	3,100	1,366,000	10,256	−5	231	10
Subtotal, flood-control projects		129,531,657	384,873,180	197		83,523,259	1,898,606	213,166,035	2,956,992	155	56	
RIVERS AND HARBORS PROJECTS												
Demopolis Reservoir	1945	0	733,000		0	218,000	95,141	1,500,000	95,000	588	0	2
Arkansas River navigation	1946 and 1950	29,418,700	37,515,000	28	0	23,034,200	378,832	22,789,000	233,832	−1	−38	1
Jim Woodruff Reservoir	1945 and 1946	0	96,000		25	0	0	1,947,000	67,133			5
Buford Reservoir	1946	2,075,000	11,218,000	441	1	1,540,000	49,600	2,647,000	62,000	72	25	1
Mississippi River between Ohio and Missouri Rivers, Chain of Rocks canal.	1945	950,000	3,910,000	312	91	530,000	1,800	789,000	2,540	49	41	60

Mississippi River to Minneapolis	1930, etc.	0	0			9,728,542	143,168	18,368,525	221,478	89	55	98
Ohio River Canal	1910	0	0			511,700	[3]	577,700	[3]	13		100
Cheatham lock and dam	1946	34,000	800,000	2,253	0	200,000	2,200	1,274,000	6,000	537	173	3
Gulf Intracoastal Waterway, La	1925, etc.	1,625,000	4,013,000	147	0	0	0	0	0			
Pearl River navigation project	1935	22,000	44,000	100	88	0	0	1,300	161			100
Fort Peck Dam	1933, 1935, 1938, and 1944.	0	0			4,235,000	212,000	4,235,000	289,009	0	36	100
Great Lakes-Hudson River Waterway	1935 and 1945	3,285,000	6,684,000	103	75	0	0	0	0			
Bonneville Dam	1933, 1935, and 1937.	4,213,910	7,166,910	70	100	942,046	5,000	1,669,046	7,113	77	42	97
McNary lock and dam	1945	6,298,000	36,800,000	484	25	1,202,000	12,000	11,000,000	46,224	815	285	27
Reconstruction of locks, 2	1909	0	0			1,800	.15	20,100	1.30	1,017	767	3
Morgantown lock	1909	814,800	221,000	−73	13	6,600	19.6	369,300	42.0	5,495	114	93
Chief Joseph Reservoir	1946	249,000	494,000	98	6	239,000	21,666	473,000	21,278	98	−2	7
Subtotal, rivers and harbors projects.		48,985,410	109,694,910	123		42,388,888	921,426.75	67,659,971	1,051,811.3	60	14	
Grand total		178,517,067	494,568,090	177		125,912,147	2,820,032.75	280,826,006	4,008,803.3	123	42	

[1] Cherry Valley project being constructed by local interests with Federal contribution based on proportionate benefit allocation of cost of Jacksonville Reservoir project which will not be needed under local interests' development.

[2] Prior to enactment of the 1938 Flood Control Act, the Federal Government did not bear the cost of relocations. The 1938 act, and the subsequent 1941, 1944, and 1946 acts placed this burden on the Federal Government. This may be a partial explanation of why the Corps of Engineers failed in some cases to make any allowance whatever for relocations in the authorization estimates. The fact remains, however, that during the same period of time, also covered by these acts, the corps on a majority of the projects made an allowance for relocations in the authorization estimates.

[3] Not available.

This table graphically demonstrates the need for better planning. Such items appear as an increase of 4,839 percent in the cost of *relocations* on an individual project (authorized in 1945) at a time when the *relocation* program was only 3 percent completed, and an increase of 3,396 percent in the cost of *relocations* on another project (authorized in 1941) when only 1 percent of the program had been completed. In the *land acquisition* category, there are such increases as 815 percent at a time when the *land* program was 27 percent completed (on a project authorized in 1945), and 1,320 percent when *land acquisition* was not even started (on a project authorized in 1941).

V. The Definite Project Report—Its Development and Present Use

The procedure of completing the planning for authorized projects and incorporating the details of completed planning in the *definite project report* was established administratively by the Corps of Engineers in 1936. From then until the present, the content and purpose of the *definite project report* has been the subject of a series of orders and regulations issued by the Corps of Engineers.

At present, the corps regards the preparation of the *definite project report* as an important step in the detailed planning of a project because it closes "the gap between the preliminary engineering design completed during the survey stage and the final engineering design necessary to initiate construction of projects." [20]

This quotation and statements made in other official documents of the corps clearly express the need for the preparation of the *definite project report* prior to the time that initial construction funds are requested. This view was stated by General Pick and Colonel Potter in the April 1951 hearings. It was restated several times in the corps' formal answer dated April 16, 1951, to the staff report. Thus, on page 15 in paragraph 19 the formal answer states:

> Definite project reports, including revised cost estimates and economic analyses, are prepared before funds for construction of a project are requested. When projects do not meet the current test of economic soundness they are not started.[21]

As stated earlier, the fact of the matter is that on a large number of projects the Corps of Engineers either had not completed the *definite project report*, or any section thereof, prior to the time that it requested funds for initial construction of individual projects. This was true in 89 out of the 182 projects in the current civil works program. On an additional 50 projects, the *definite project report* is not required by the corps and, therefore, has not been prepared. As a result, in 139 out of 182 of the projects, detailed planning and the computation of accurate cost estimates subsequent to the *survey report* were not achieved.

(a) *Development of the definite project report procedure*

The corps in its first general regulation dealing with the development of *definite project reports*, under date of April 12, 1939, stressed the importance of the full development in the *definite project report* of all the factors involved in projects in order "to crystallize a plan of

[20] Civil Works Administration, Initiation of Projects, prepared during 1949–50 for use in the Engineers School at Fort Belvoir, Va.

[21] See also p. II–19, par. 33a, and the full discussion by the corps of this point in appendix IV to the formal answer. In pars. 5 and 7 thereof, the corps states unequivocally that the justifications for construction funds presented to the Appropriations Committees are based upon the definite project report.

improvement which heretofore had been only of a general nature." This view was further developed in a circular letter of October 23, 1944, which formalized the *definite project reports* by prescribing the size and type of paper to be used, and specified in detail the format and requirements for submission and distribution. Attached to this circular letter was a formal outline of the *definite project report* accompanied by appropriate definitions and explanations of the various subjects which were required to be included. The 1944 letter defined a *definite project report* as an integrated document which was "designed to serve as a basis for intelligent detailed programing of an authorized project, including the engineering, maintenance and operation, fiscal, and legal phases." It is specifically stated that the *definite project report* is further designed to assist the office of the Chief of Engineers in justifying appropriation estimates before the Bureau of the Budget and the Appropriations Committees of Congress.

Until 1947 the corps required that the *definite project report for the entire project* be completed prior to the request for initial construction funds. In that year the corps deviated from this requirement. Thus in orders and regulations issued September 1, 1947, the corps for the first time provided that the *definite project report* could be prepared in sections, on major projects for flood control or multiple purposes and for major navigation structures. Such sectional *definite project reports* would cover major elements of a project such as a dam and reservoir, a lock and dam, or a distinctive unit of local flood protective works. These orders and regulations described in considerable detail the form of the *definite project report* and the individual subjects to be discussed. Again it is noted that the report was to be a formal document, standardized throughout the Corps of Engineers both as to format and content.

This departure from the preexisting practice (which had been to complete the *definite project report* for the entire project before requesting initial construction funds), had this result:

The sectional *definite project report* for one phase of the project provided a sound cost estimate for that one phase, but not for the whole, integrated project. The cost estimate for the balance of the project was not based on planning subsequent to the *survey report*, but rather on the cost estimate in the *survey report* itself, perhaps increased by the rise of cost indexes. The rise in construction costs is only one of many factors of cost increase. Therefore, the corps could not and did not compute sound cost estimates, and the Appropriations Committee, being deprived of this vital information, was hamstrung in the exercise of its important function.

By letter of August 12, 1949, the Corps of Engineers discussed further revisions in the *definite project report* and specifically reaffirmed the use of sectional *definite project reports*. The corps pointed out:

> Submittal of some sections of the definite project report following initiation of construction should reduce the amount of planning funds required prior to the allotment of construction funds.

More recently, the corps revised the *definite project report* procedure in orders and regulations issued November 30, 1950. The purpose of the *definite project report* was stated to be:

> Definite project reports are required for all authorized projects except dredging projects to serve as a basis for programing the planning and construction of the project, to establish definitely the most suitable plan for accomplishment of the

project, including the engineering criteria, location, type, and capacity of structures, and the estimate of cost, to provide a definite basis for preparation of final detailed plans and specifications, and justification of budget estimates, and to provide a source of up-to-date information for members of Congress, Federal and other governmental agencies, and the public.

The 1950 revision discussed further the preparation of *definite project reports* in sections. Discretion is left within the field offices to determine whether to complete *definite project reports* for an entire project, or whether to take a project up piecemeal and submit a *definite project report* in separate sections.

It is evident that the net result of the corps' 1947, 1949, and 1950 revisions of the *definite project report* procedure has been to delay the completion of necessary planning for an entire project until after Congress has committed itself to the project by appropriating initial construction funds. Yet as recently as April 3, 1951, General Pick and Colonel Potter assured the committee that the corps *completes* the *definite project report before* requesting initial construction funds. They also testified later (on May 23, 1951) in the recent hearings on the proposed Tennessee-Tombigbee waterway as follows:

Colonel POTTER. * * * As to the definite project report, never to my knowledge in my testimony either before the Senate or the House committee have I ever been asked for a definite project report. It is not a legislative piece of paper. It is a tool of the Corps of Engineers of the project to prove that we are right in coming in for an appropriation.

Mr. DONNELLY. But your definite project report contains the best figures of the total estimated construction cost of the project, does it not?

General PICK. That is right; that is given to the Bureau of the Budget when they estimate the funds, they estimate what the cost is going to be in considering our appropriation.

(*b*) *Nonavailability of definite project reports in the Office of the Chief of Engineers*

Orders and regulations of the corps have consistently required the submission of a number of copies of the completed *definite project reports* to the Chief of Engineers for his review and approval. Once the Chief has approved a *definite project report*, no major deviation from its terms and requirements is permitted without his prior approval.[22] However, *definite project reports* have not been prepared for many of the projects now under construction, and therefore are *not* available in the Office of the Chief of Engineers. This situation indicates that the Chief of Engineers may not have a sufficient check on the division and district offices engaged in the planning and construction of projects. In this connection it is interesting to reexamine the following comment by the House Appropriations Committee in its 1950 report:[23]

[22] Sec. 4214.12 of the latest revision of orders and regulations governing definite project report procedure Nov. 30, 1950) provides as follows:

"After approval of a definite project report or section thereof, no major deviation from its terms and requirements will be made in the preparation of final plans and specifications without prior approval of the Chief of Engineers. Upon receipt of approval of any such changes, correction sheets or revised pages, appropriately marked and dated, will be furnished by the district engineer for insertion in all copies of the definite project report previously distributed."

This is a restatement of the requirement. Prior orders and regulations contained similar provisions.

[23] Rept. No. 1797, 81st Cong., 2d sess., March 21, 1950.

As a matter of fact, the committee has reason to believe that very little cost and engineering data with respect to individual projects is on file with the Chief of Engineers, most records being maintained at the offices of the various district engineers. Consequently, these excessive obligations of Federal funds are being incurred by the district engineers and are, it would seem, approved by the Chief of Engineers as a matter of form.

Regardless of the degree of control and check which the Chief of Engineers may desire to exercise administratively over the corps' field offices, it is apparent that Congress should have a closer check on the planning and construction performance of the projects.

(c) *Need for early completion of the Engineering Manual for Civil Works as a guide to the corps' field offices in planning and constructing projects*

In 1944 the corps commenced the preparation of the Engineering Manual for Civil Works. It has not been completed, despite its importance in the planning of civil works projects and its need as a guide to the corps.[24] This manual is constantly referred to in the *definite project report* procedure prescribed in orders and regulations. These require that the provisions of the manual be followed in many important particulars. The chapters and parts of the manual prescribing general planning criteria have, in all but two instances, progressed only through the first draft and the first review. They are as follows:

Part or chapter	*Subject*
CI.	General planning and reports:
	1. Introduction.
	2. Basic laws and authority.
	3. Procedure.
	4. Style and format of reports.
CII.	River and harbor planning:
	1. Preliminary examination.
	2. Survey.
	3. Definite project.
CIII.	Flood-control planning:
	1. Preliminary examination.
	2. Survey.
	3. Definite project.
CIV.	River and harbor reports:
	1. Examination and review.
	2. Survey and review.
CV.	Flood-control reports:
	1. Examination and review.
	2. Survey and review.
CVI.	Definite project report.
CVII.	Recreation report.
CVIII.	Basis of design report.
CIX.	Information pamphlets.
CX.	Surveys.
CXI.	Maps.
CXII.	Benefits.
CXIII.	Cost estimates:
	1. Report estimates.

The corps states that the requirements of the manual are included in the orders and regulations prescribing the *definite project report* procedure. To the contrary, the orders and regulations time and

[24] A graph prepared by the corps showing the status of the Manual as of July 1, 1951, is printed below in the appendix at p. 135.

again refer to the requirements of the manual as an integral part of the procedure.

Thus, in the October 1944 revisions and improvements in the *definite project report* procedure, the corps' field offices were directed to consult chapter IV of the manual, covering Geological Investigations. This chapter was completed between January and September 1944 and distributed in printed form in September 1944. A revision of it was started in July 1947, but has not been completed.

The orders and regulations of 1947 specifically directed that the manual be used as a guide in planning, in the following provisions.[25]

4214.02 *Scope*

"a. * * * More detailed information for guidance on scope and other features of the definite project report is given in the *Engineering Manual for Civil Works.*"

"c. * * * The outlines presented in paragraphs 4214.10 to 4214.33 and in the *Engineering Manual for Civil Works* should be used as a guide to insure completeness of brief reports."

4214.07 *Engineering Criteria*

"All applicable criteria set forth in the *Engineering Manual for Civil Works* will be used, and appropriate references will be made in the definite project report to the applicable portions of that manual."

4214.11 *Form and Order of Report*

"* * * Additional information on the technique and scope of coverage under various items is given in the *Engineering Manual for Civil Works.*"

4214.33 *Appendices*

"Establish the 'Basis of Design' by giving detailed accounts and descriptions of studies, criteria (appropriately cross-referenced to the *Engineering Manual for Civil Works*), and other pertinent data, with additional supporting drawings and illustrations in a series of appendices on the subjects of hydrologic and hydraulic analyses, geology, soil data and analysis, hydraulic design, structural design, hydroelectric power, recreational development, relocations, availability of construction materials, special studies, and miscellaneous data (including views and recommendations of any consultants employed), transcripts of public hearings or extracts or summaries therefrom and data on real estate as required in part II, chapter V, O & R."

4215.02 *Criteria for Preparation of Plans and Specifications*

"b. The criteria and design procedures prescribed in the *Engineering Manual for Civil Works* will be utilized wherever applicable in the preparation of plans and specifications."

To restate the significant fact, this manual is far from completion even though its preparation was started 7 years ago.

The latest revision of the *definite project report* procedure, in the orders and regulations issued November 30, 1950, reaffirm the status of the incompleted manual as an integral part of the planning procedure in such provisions as these:

4214.02 *Scope*

"a. * * * More detailed information for guidance on scope and other features of the definite project report is given in the *Engineering Manual for Civil Works.*"

"c. * * * The outlines presented in paragraph 4214.09 *a.* and in the *Engineering Manual for Civil Works* should be used as a guide to insure completeness of brief reports."

4214.07 *Manuals and Bulletins*

"a. *Engineering Manual.* The *Engineering Manual for Civil Works Construction (in preparation)* published by the Chief of Engineers is the basic design guide for all civil-works construction, as distinguished from military construction, under-

[25] Emphasis supplied to the words "Engineering Manual for Civil Works" wherever they appear.

taken by or under the jurisdiction of the Corps of Engineers The subjects to be covered in this manual include: planning; surveys and mapping; cost estimating; hydrologic and hydraulic analysis; subsurface investigations; soil mechanics, hydraulic, electrical, and mechanical design; criteria and structural design applicable to the various type of related civil-works structures; and hydro power studies and beach-erosion studies. The manual will be modified or revised as necessary to keep abreast of changing techniques and procedures. The wording of the text of the manual indicates the extent to which the application of the principles is mandatory and the extent to which the material it contains is advisory. Certain chapters issued with the designation "Preliminary" are for temporary use pending more complete and thorough coordination with those having responsibilities in connection therewith."

"b. *Engineer Bulletins.* Civil Works Engineer Bulletins issued by the Chief of Engineers are used as a medium for disseminating technical information and advice on design and construction of civil works projects and they will be considered advisory to the same extent as the *Engineering Manual.* In most cases, the bulletin material will eventually be incorporated into the *Engineering Manual* but subjects outside the scope of the manual also may be covered."

"c. *Application of manual and bulletins.* All applicable criteria set forth in the *Engineering Manual for Civil Works* or the Civil Works Engineer Bulletins will be used, and appropriate references will be made in the definite project report to the applicable portions of the manual or to specific bulletins. Other criteria adopted to meet special or local conditions will be explained and justified in the report. The engineering criteria will be carefully determined and adequately presented in the definite project report, as they will establish the basis for final plans and specifications (See par. 4214.12). In order to expedite the preparation of the definite project report and to minimize revisions, District Engineers will, prior to initiation of work on the definite project report, submit recommendations with justification for any proposed engineering criteria for which there is no established precedent or which will have major effect in the design of the project. Advice on important engineering questions will be obtained from the Chief of Engineers as early as practicable in the course of preparation of the definite project plan."

4214.09 *Outline and Form of Reports*

"a. *Main report.* Comprehensive definite project reports will include the applicable items of the typical outline shown below and any additions required for the specific case at hand. Additional information on the technique and scope of coverage under the various items is given in the *Engineering Manual for Civil works* (See also paragraph 4214.02b)."

"b. *Appendices.* The appendices which supplement the main report will establish the basis of design by giving results of investigations and analyses, criteria proposed, and other pertinent data (appropriately cross referenced to the *Engineering Manual for Civil Works*) which form the basis for the over-all project design. The following sample outline indicates a suggested coverage that would be considered suitable in the case of a hypothetical multiple-purpose project. The outline will have to be adjusted to suit the type of project involved."

The incompleted status of the manual is still another demonstration of the lack of careful planning and estimating. The Corps has indicated that the delay in completing the manual is due primarily to lack of personnel to do the job, and that the completion of the manual will be expedited as much as possible within present limitations of funds and personnel.

Congress has in the past year deemed it wise to hold the civil works program to present commitments. The House Appropriations Committee on June 8, 1951 recommended: [26]

Accordingly, the committee suggests that the Corps of Engineers make an economic reevaluation from a national standpoint of all projects presently in the planning stage with a view to effecting greater economies and a better integrated national program. Sectionalism should play no part in the development of our natural resources. The President in his message to the Congress, in approving H. R. 5472, Eighty-first Congress, points out some of the inadequacies in our present plans for the development of our natural resources. While some coordinating with other interested agencies has from time to time been done, the

[26] H. Rept. No. 544, 82d Cong., 1st sess.

committee believes that a study of the proper approach to the development of our natural resources, completely coordinated with other agencies of the Government, might well be considered.

With respect to one phase of coordination with other agencies, corps representatives testified in the recent hearings on the proposed Tennessee-Tombigbee Waterway (May and June 1951) that the question of the economic evaluation of projects (computation of benefits in the benefit-cost ratio) had not been finalized uniformly throughout the Government agencies having responsibility for the consideration of natural resource development. The chapter on "Benefits" in the Engineering Manual for Civil Works has barely been started. It is still in the outline stage, and a first draft has not even been written.

The computation of benefits on proposed civil works projects is of vital concern to Congress, since upon it Congress decides the crucial question of whether (1) to authorize a project, and (2) to appropriate funds to initiate construction. Representatives of the corps [27] participated in the preparation of a formal report entitled "Proposed Practices for Economic Analysis of River Basin Projects" made in May 1950 to the Federal Inter-Agency River Basin Committee.[28]

Corps representatives also participated actively in the work of the President's Water Resources Policy Commission. In the Commission's formal report of December 11, 1950, to the President, acknowledgment is made of the assistance of 32 officials of the corps. With respect to benefits and costs, this report comments:

> The report of the Inter-Agency Subcommittee on Costs and Benefits represents by far the most thorough and expert job ever done on this phase of water resources policy. But it is concerned with projects. During 4 years the members, representing five agencies, codified existing practices, examined applicable economic theory, and reached conclusions as to the principles guiding economic evaluation of resources projects and cost allocation.

By virtue of this work on benefits and costs, the corps' planners undoubtedly are well qualified to prepare for the Engineering Manual for Civil Works the important chapter on "Benefits."

Since Congress has called a halt to the commencement of new projects, pending a reevaluation of the projects now in the planning stage, completion of the manual should be driven through to completion.

(*d*) *The paradox in planning projects after authorization—Summary*

Changes by the Corps of Engineers in the *definite project report* procedure have resulted in the following paradox:

1. The *survey report* (upon which the authorization act is based) is not a sound basis upon which the corps should request initial construction funds for a project.
2. Recognizing this, the corps has developed over the years (since 1936) the procedure of completing the planning for individual projects and incorporating this vital information in a formal document, known as a *definite project report*.
3. The *definite project report* will furnish to the corps and to Congress a sound basis upon which to determine whether initial construction funds are to be appropriated for a project.

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[27] George L. Beard, Chief, Planning and Development Division, Civil Works, Corps of Engineers; and Eugene W. Weber, Special Assistant on Civil Works, Corps of Engineers. In 1949–50 these officials were, respectively, a member, and a staff member, of the Subcommittee on Benefits and Costs of the Federal Inter-Agency River Basin Committee.

[28] The corps has distributed this report to its field offices.

4. The *definite project report* is not prescribed by statute but is an administrative procedure within the corps.

5. The corps has not deemed it necessary to make *definite project reports* on a large number of projects (50 out of 182 in the current program).

6. The corps has consistently told this committee that its request for initial construction funds for individual projects is based upon completed *definite project reports*. Actually they were completed on only a small number of the projects (25 out of 182) before the corps requested initial construction funds. In other words, the committee has been considering requests for initial construction funds for projects where the planning of such projects has not advanced to the point where sound cost figures are available.

7. Since 1947 the corps has altered the *definite project report* procedure to such an extent that planning for the entire project is done piecemeal and Congress, when it commits itself to projects by appropriating initial construction funds, does not have the benefit of sound cost estimates based upon completed planning.

8. In many cases the Chief of Engineers does not have in his Washington headquarters copies of *definite project reports* for many projects under construction.

9. The corps now desires to defer the completion of the *definite project report* until construction of a project is almost completed.

Now that these facts have been developed through investigation, hearings, and conferences between committee counsel and representatives of the corps, it has become apparent that Congress needs a closer check on the Corps of Engineers, and that changes are necessary and desirable in the corps' procedure—planning must be completed before Congress is asked for initial construction funds.

(*e*) *Improvements in the planning procedure either already initiated or contemplated by the corps*

On July 20, 1951 the corps furnished committee counsel a statement entitled "Development of Policies and Procedures of the Corps of Engineers for the Planning of Civil Works Projects." (This statement in its entirety is printed below in the appendix.) Its scope and purpose is set forth in the following prefatory language:

> 2. Policies and procedures utilized by the Corps of Engineers in the planning of civil works projects have undergone constant modification and improvement as the Federal program of water resource development has expanded in scope and complexity, and on the basis of experience gained through the years. At the present time planning of civil works projects begins with the preliminary examination designed to determine whether a detailed survey should be made; continues through the survey stage, resulting in reports and recommendations to Congress for authorization; thence to the preparation of definite project studies and reports, when planning funds are appropriated after authorization; and, culminates in the preparation of detailed plans and specifications for construction of the works. This statement presents the development of these planning procedures, the improvements which have been made, and those which the Corps of Engineers intends to accomplish.

This statement carefully sets forth the planning procedures, from their genesis up to the present day.

One recent improvement, inaugurated by the corps on June 1, 1950, concentrates in a Design Branch in the field offices the planning and

estimating responsibility for the planning embodied in the *survey reports and* the subsequent *definite project reports*. This assures continuity of planning responsibility in the hands of the same experienced engineers. The head of the Design Branch reports direct to the Chief of Engineering Division.

This was a sequel to the requirement a year earlier which had accomplished a similar result at Washington headquarters, by requiring the review of *preliminary examination* and *survey reports* by the Civil Works Division of the office of the Chief of Engineers. These engineers eventually have responsibility for the planning of the *definite project report* and actual project construction. Bringing them into the planning at the *survey report* stage is intended to insure (1) continuity of responsibility throughout the development of project plans, and (2) the adequacy of designs, cost estimates, and economics.

It is to be noted that the corps details seven substantial improvements *to be accomplished* in the *survey report* stage. However, the corps is satisfied with the present *definite project report* procedure, and does not intend to inaugurate any major changes therein.[29]

VI. The "Planning Report"—A Solution Designed to Assure Congress a Necessary Check on the Planning and Construction Performance of the Corps

The *definite project report* procedure, as presently constituted, is not designed to complete project planning *before* initial construction funds are requested. Therefore, it is vital that a more advanced report than the *survey report*, to be known as the "*planning report*," be completed by the corps prior to the time that initial construction funds are requested. This report should be similar in format, content, and the nontechnical terminology of the *survey report*, and that it should cover at least the following cardinal points:

1. Complete description of the project, indicating any changes from the project as described in the *survey report*. Power and other features to be included.
2. An up-to-date estimate of the construction costs, specifically designating the amount of contingencies allocated to each item.
3. A statement of the rate of prosecution of the work, including the most economical construction schedule and money requirements.
4. An up-to-date economic analysis, and reevaluation of the benefit-cost ratio.
5. Relocations requirements and cost.
6. Land acquisition requirements and cost.
7. Changes in the public necessity for the work and propriety of its construction, continuance or maintenance at the expense of the United States.
8. Status of local cooperation.
9. The applicability of provisions of continuing authorization acts to the project.

The *planning report*, accompanied by the recommendations of the Board of Engineers for Rivers and Harbors, should be submitted by the Chief of Engineers through the Secretary of the Army to Congress,

[29] The corps states in par. 41 of the statement, "Development of Policies and Procedures, Etc." as follows: "The definite project procedure now in force is considered to be adequate and no immediate changes are in prospect except normal modifications to effect economies and more efficient prosecution of the work."

and printed as a Congressional document. To assure to Congress a continuing check on the corps' estimating and construction performance, the corps should file each year with the Appropriations Committees, in January, a statement of progress for each project under construction in such form as to permit ready comparison with the planning report.

The need for this recommended improvement is even more apparent upon examination of concrete illustrations of the inadequacy of present planning for appropriation purposes. These illustrations, to be taken up next, strongly demonstrate the need for the *planning report*, and the need for the enactment of legislation requiring the *planning report* procedure.

VII. Concrete Illustrations of the Inadequacy of Present Planning Procedure for Appropriation Purposes

(a) *The Missouri River*

The corps has been engaged for many years in planning the development of flood control, navigation and power projects on the Missouri. Four so-called "main-stem" reservoirs are now under construction at an estimated cost for fiscal year 1952 of $859,932,000. The economic justification for each of these four projects is close to the minimum statutory requirement, as shown in the following table:

Project	Authorization estimate	Fiscal year 1952 estimate	Benefit-cost ratio
Fort Peck	$84,155,000	$156,900,000	1.3
Garrison	105,000,000	258,000,000	1.2
Oahe	72,800,000	245,900,000	1.4
Fort Randall	75,000,000	189,200,000	* 1.5
Total	336,955,000	860,000,000	

* Will drop to about 1 if Gavins Point project is not constructed.

Fort Randall has the most favorable economic ratio, 1.5; yet this is so dependent on the proposed Gavins Point project that it will drop to about 1 if Gavins Point is not constructed. Continued planning for Gavins Point (for which the ratio is only 1.1) has steadily increased the cost estimate, as is readily discerned from these figures:

		1 generating unit	3 generating units
December 1944	Authorization	$15,000,000	
March 1949	Preliminary studies	42,725,000	
November 1949	Definite project report	49,257,000	$54,930,000
December 1950	Supplemental report	54,405,000	60,905,000
December 1950	Supplemental report (design change)	48,552,000	55,052,000
Apr. 19, 1951	Justification of estimate testified to by corps' representative in fiscal year 1952 hearings.		44,900,000

The *definite project report* figure of $54,930,000 gives Congress a much sounder estimate than the $44,900,000 furnished to Congress on April 19, 1951.

Initial construction funds for Gavins Point have not yet been appropriated. However, construction of at least two of the four

large projects was commenced before the completion of planning, with expensive results.

Garrison project

Authorization	1944 Flood Control Act.
Authorization estimate	$105,000,000.
Estimate for fiscal year 1952	$268,000,000.
Tentative estimate as of July 1, 1951	$268,000,000.
Benefit-cost ratio	1.2.
Percent of completion at end of fiscal year 1951	42 percent.

The increased project cost is caused by several factors in addition to rise in prices. Errors in engineering estimating account for $17,894,000, or 17 percent of the authorization estimate. Relocations are now estimated to cost 154 percent more with the relocations program only 3 percent complete, and lands 176 percent more with the land program 64 percent complete.

Between fiscal years 1951 and 1952 the corps reported a cost rise of 32½ percent, and explained that they had not previously kept Congress advised of the annual effect of rising prices. The following colloquy in the fiscal year 1952 hearings is significant:

Colonel POTTER. Referring to the indicated costs on the chart, which were $158,000,000 in 1946, $177,000,000 in 1947, $188,000,000 in 1948, $202,000,000 in 1949, and $268,000,000 in 1950.

Mr. MCGRATH. Has not this resulted in giving the Congress, then, in prior years, a distorted view of the benefit-cost ratio to the money to be expended?

Colonel POTTER. Yes, sir, it has, and the reason is bad judgment, Judge. Our judgment was not substantiated by conditions.

Colonel Potter explained that engineering changes had been responsible for a cost increase of $4,241,000,[31] and stated that the design of the diversion works had not been completed until a year and a half ago. Even today the corps has not determined at what depth in the river bed that construction will be started.[32]

Oahe project

Authorization	1944 Flood Control Act.
Authorization estimate	$72,800,000.
Estimate for fiscal year 1952	$245,900,000.
Tentative estimate for July 1, 1951	$269,000,000.
Benefit-cost ratio	1.4
Percent of completion at end of fiscal year 1951	4 percent.

[31] "(c) *Structural and engineering modifications, $4,241,000.*—This increase results from more detailed engineering investigations and further development of the details of construction and design. Typical examples of the additional work which is required as a result of these detailed studies are as follows:

"New and more remote source of concrete aggregate was found necessary since aggregate from originally contemplated source proved to be of inadequate quality; provision of town site power facilities due to lack of sufficient locally available power; additional work on the dam embankment and foundation for seepage control; additional surface drainage for erosion prevention; and alteration of the alinement of certain channels for improved hydraulic and other design considerations" (p. 505 of the hearings).

[32] The following colloquy appears at pp. 505–506 of the hearings:

"Mr. FORD. Are there any other contemplated engineering modifications in the years ahead?

"Colonel POTTER. I believe that the major uncertainties at the initiation of this project are now known and there should not be any further major engineering modifications.

"The only unknown still remaining is the exact condition of the river bed at the depth at which we start our construction. It is contemplated at the present time that we will start fill at this elevation [indicating], say, 100. When we actually open it up, it may be that we will have to go down another 10 or 15 feet in order to get proper foundation conditions.

"When this project was first visualized and we received our first appropriation, we considered we would divert the water through this dam by means of huge penstocks through the main fill. The fill is to be about 1,400 feet wide, and we believe that it will settle at a fairly uniform rate and that we would have those tubes settle at about the same rate; but, after making analysis and model studies, we felt that we were taking too much of a chance to put those tubes through the main embankment, and other methods were devised which resulted in engineering changes that cost some additional money. However, the spillway of the dam can never be subject to question. It must be a positive closure that will not fail. A change of that scope should not be necessary in the future because we do have designs on all of the major parts of the job."

The authorization estimate for this project was grossly inadequate, as readily illustrated by the increases caused by the following factors:

	Amount	Percent of authorization estimate
Unforeseen conditions	$18,759,000	25.7
Inadequacies	17,760,000	24.5
Modifications	7,692,000	10.6
Total	44,211,000	60.8

Not only did these three factors cause an increase of 60.8 percent over the authorization estimate, but there were large increases for relocations (180 percent with the program not started) and for lands (165 percent with only 1.5 percent of the program completed).

The better planning embodied in the *definite project report* is evident. This report was completed in 1948, and estimated the cost at $221,242,000. Significantly, at this time a considerable alteration was made in the basic design of the dam and reservoir.

Fort Randall project

Authorization	1944 Flood Control Act.
Authorization estimate	$75,000,000.
Estimate for fiscal year 1952	$189,200,000.
Tentative estimate as of July 1, 1951	$197,300,000.
Benefit-cost ratio	1.5. [1]
Percent of completion at end of fiscal year 1951	46 percent.

[1] Will drop to about 1 if Gavins Point is not constructed.

The authorization figure underestimated the cost by at least 30 percent, separate and apart from the rise in prices; i.e.:

Unforeseen conditions	$13,114,500
Inadequacies	5,855,000
Engineering modifications	4,337,000
Total	23,306,500

The cost of lands is now 277 percent over the authorization estimate, and the acreage increased 20 percent, with the land program only 23 percent completed. Relocations have increased 287 percent with the program only 4 percent completed.

A very serious error was caused by the gross miscalculation of the cost of housing for construction workers. This is now costing $11,572,000 against the original estimate of $300,000.

The value of complete planning before initial construction funds were appropriated is again apparent. The *definite project report* was completed in 1946, based on 1946 prices. The estimate was stated to be $133,132,000, showing an increase of 77.5 percent over the authorization estimate of $75,000,000. The 77.5 percent was made up of 30 percent for price rise and 47.5 percent for engineering modifications, contingencies, and increased overhead.

Fort Peck project

Authorization	1935 to 1944.
Authorization estimate	$84,155,000.
Estimate for fiscal year 1952	$156,900,000.
Tentative estimate for July 1, 1951	$156,900,000.
Benefit-cost ratio	1.3.
Percent of completion at end of fiscal year 1951	84 percent.

This project was first authorized in 1935, and the corps initiated the *definite project report* procedure in 1936. Even though construction of the project has extended over many years, and is not yet completed, the corps has taken the position that a *definite project report* is not required.

The authorization estimate has been exceeded 37 percent for such reasons as—

Unforeseen conditions	$15, 126, 000
Engineering modifications	11, 450, 000
Inadequacies	4, 975, 000
Total	31, 551, 000

(*b*) *Other projects*

The study of a number of other projects in the current construction program further demonstrates the need for the *planning report* to close the planning gap between the *survey report* and the *definite project report*.[33]

Red Lake and Clearwater Rivers

This project forcefully illustrates the need for completed planning before initial construction funds are appropriated. An engineer of the committee staff studied the *definite project report* for this project and advises that generally favorable conditions obtained in practically all features of the project, i. e., earthwork easy; construction material available; relocation work easy; recreation space not needed.

The corps requested construction money for fiscal year 1947 in advance of the completion of the *definite project report*. When the *definite project report* was later completed in 1947, the cost estimate of the project was 2½ times greater than that contained in the *survey report*. Increases attributable to such categories as *inadequacies*, *unforeseen conditions*, and *engineering modifications*, amounted to more than 100 percent of the cost estimate for the total project as stated in the *survey report*.

Isabella Reservoir

This is another project where the *definite project report* cost estimate is about 2½ times the estimate contained in the *survey report*. *Relocations*, only 1 percent completed, have increased in cost 498 percent; *lands*, only 29 percent completed, have increased in cost 137 percent. Funds to initiate the construction of this project were appropriated prior to completion of a *definite project report*.

Baldhill Reservoir

The Baldhill Reservoir was authorized in the 1944 Flood Control Act on a *survey report* estimate of $810,000. Initial construction funds were appropriated in fiscal year 1947, based on this $810,000 estimate. The *definite project report* was completed on May 22, 1947 and estimated the cost of the project to be $2,044,500. *Inadequacies* and *unforeseen conditions* on this project now total $811,090. In other words, the cost of the project has increased at least 100 percent over the *survey report* estimate because of these two categories. In addition, the cost of *lands* has been increased in acreage by 33 percent and in cost by 205 percent.

[33] Summaries of several projects, in addition to those about to be set forth, are printed below in the appendix.

Construction was initiated on this project on the basis of inadequate planning. When planning had been completed, it was apparent that the project would cost 2½ times as much as when Congress appropriated initial construction funds. The *definite project report* figure of $2,024,500 was not used by the engineers as a basis for appropriations justifications until fiscal year 1949.

Philpott Reservoir

On the other hand, in the case of Philpott Reservoir, the *definite project report* was completed before initial construction funds were appropriated. With the planning thus completed, the cost of the project has been increased only negligibly for such items as *inadequacies*. However, this project also illustrates the need for improvement in the corps' planning for *relocations* and *lands*. The cost of *relocations* was increased 312 percent, and the cost of *lands* 250 percent over the corps' estimate in the *survey report*.

Schuylkill River

The *survey report* estimated the construction cost to be $12,895,000. Based upon this estimate, the project was authorized in the 1946 River and Harbor Act. Upon completion of the *definite project report* on March 8, 1950, it became apparent that the project would cost slightly less than the amount estimated in the *survey report*. This is unusual since the costs of projects have almost universally increased. It does illustrate that good planning can save money.

Buggs Island Reservoir

During conferences with committee counsel, representatives of the corps suggested that it might be uneconomical to complete a *definite project report* before requesting initial construction funds because of the time required for detailed planning. Yet the *definite project report* for this large project, estimating the cost to be $57,730,000, was completed in 13 months.

(c) *Projects for which the corps does not require definite project reports*

The corps has taken the position that certain types of civil works projects are so standardized that *definite project reports* are unnecessary, and the corps cites dredging projects as an example. Yet tremendous cost increases on the 50 current projects in this category are substantial, $1,209,439,129 to $2,182,636,400.

Missouri River

The work on the Missouri River, to Sioux City, was authorized in 1927 and 1945. Authorization estimates totaled $20,000,000, and the cost in fiscal year 1952 has increased to $172,112,900. The rise in construction costs is responsible for approximately $50,000,000, of this increase, but other reasons are significant:

Inadequacies	$43, 475, 000
Engineering modifications	37, 109, 830
Unforeseen conditions	18, 603, 070
Total	99, 187, 900

Authorized project extensions have, at the same time, amounted to only $3,500,000.

Fort Peck

This is not a dredging project, but a dam. The cost has increased from the authorization estimate of $84,155,000 to $156,900,000. As pointed out earlier, a *definite project report* has not been made for this project. The requirement of the *planning report* will assure that planning is completed on any future project of this type before initial construction funds are requested.

Georgetown Harbor, S. C.

In 1948 Congress authorized a cut-off and side channel on the basis of a *survey report* estimate that no additional cost would be entailed beyond the 1945 project authorization of $1,260,000. The project as a whole increased $1,200,000 between fiscal years 1949 and 1950 due to *unforeseen conditions*.

The corps has requested construction funds for this project for every fiscal year from 1947 to the present, even though planning has not been included in a *definite project report* on the corps' theory that this is a dredging report. The new *planning report* will, therefore, provide a report subsequent to authorization where none presently exists.

St. Thomas Harbor

This is a dredging project authorized in 1937 River and Harbor Act upon a *survey report* estimate of $743,000. The estimate for fiscal year 1952 is $2,650,000. It is the type of project for which no *definite project report* is normally prepared. Yet *unforesseen conditions* and *inadequacies* total 130 percent in excess of the original *survey report* estimate. Congress has never appropriated any money for this project, either planning or construction.

Potomac River

Occasionally the corps prepares *definite project reports* even on dredging projects. In the case of the Washington Channel of the Potomac River, a *definite project report* was prepared but not until 1945, because it was the type of project for which a *definite project report* was not normally required. The authorization estimate was $1,261,000, and the estimate today is $6,461,200 solely attributable to the rise in construction costs. The price rise on this project has increased to such an extent that it is far greater than the ENR price rise index [34] for the same period, exceeding the ENR rise more than 100 percent.

Other projects

The value of the new *planning report* is also apparent in other dredging projects which have been studied, such as Trinity River, Jacksonville Harbor, and Tampa Harbor.

(*d*) *Land acquisition*

As previously seen in exhibit 10 showing the increase in cost of land acquisition on individual projects, the average increase in acreage has been 42 percent and the increase has been 123 percent. The individual projects listed in the exhibit to illustrate the need for the new *planning report* show much higher percentages. These increases are significant and account for substantial portions of the increase of the

[34] Published monthly in a journal of the engineering profession, entitled "Engineering News-Record."

cost of projects. Better planning can improve this phase of projects, and will save money.

Between the preparation of the *survey report* and the completion of the land-acquisition program on individual projects, there is a lapse of as much as 10 years. The lapse between the preparation of the *definite project reports* and the completion of the land-acquisition program is, as a general rule, 5 years. It is obviously difficult to estimate today the cost and acreage of land to be acquired 10 years hence. This fact establishes conclusively that the *survey reports* do not provide a sound basis upon which Congress should consider the appropriation of initial construction funds. The land-acquisition problem is another urgent reason for completion of the new *planning report* to close the gap between the *survey report* and the *definite project report.*

Unavailability of good maps is one reason for gross underestimates by the corps on land costs and acreage. The corps has advised that the making of maps for use in the estimating done in the *survey report* is impracticable because of the limitation of funds and time devoted to the preparation of the *survey report.* However, the maps used in the planning done after the *survey report* and before the initiation of construction are often of no greater accuracy or completeness than the maps used in the *survey report.* Justification may exist for this in the preparation of the *survey report,* but with the availability of aerial mapping, inaccurate estimating in either the *planning report* or the *definite project report* could not be justified.

(*e*) *Relocations*

As also shown in exhibit 10, the increase in project costs for relocations is substantial, averaging 177 percent for those of the 182 projects which involve this factor. The Corps of Engineers has conceded that the cost of relocations represents a large and significant portion of the total cost of many projects. In the recent conferences between committee counsel and representatives of the corps, the latter stated that the *survey report* estimates for relocations are too tentative to be relied upon for construction purposes. This is an even more impelling reason for the preparation of the *planning report* to close the gap between the *survey report* and the initiation of construction of projects.

The inadequacy of maps has a bearing on relocations just as it has a bearing on land acquisition. The Fort Randall project planning, estimated in the *survey report* to cost $75,000,000, was based on 1890 maps. The cost of this project has increased to $197,300,000 (fiscal year 1953 estimate), and the increased cost of relocations has been substantial. With only 4 percent of this program completed, the cost of relocations has increased 280 percent over the estimate in the *survey report.*

The Corps of Engineers points out that it is their general practice to use available maps and make the best possible relocation estimates from them, stating that the detailed mapping necessary to final relocation estimates is costly and time consuming. The engineers further stated in their formal answer that it is usually necessary to investigate many site locations before final determination. Although

such uncertainty may prevail at the time the *survey report* is completed, the corps should certainly know where a project is going to be when it asks Congress for initial construction funds. Since *definite project reports* are not completed in most cases before initial construction funds are requested, the *planning report* will close this planning gap. No better argument is needed than the corps' statement in its formal answer as follows:

> In some original project estimates the requirements for relocations which later proved necessary were underestimated or omitted. This was due to the fact that the full extent of such relocations and their costs could not be determined accurately without detailed surveys and foundation investigations, and such information and studies could not be available during the survey state of planning.

Betterments

In the relocation of facilities—railroads, highways, bridges, public utilities, and the like—local interests generally desire the construction of better facilities than those being replaced. This is due to the fact that the physical requirements of today's standard facilities are far advanced over those constructed years ago. Simple illustrations are roads and bridges. An existing 24-foot road if built today is 38 feet wide, including shoulders, and existing 18- and 20-foot bridges 26 and 30 feet wide. The question is whether or not local interests are entitled to replacement of the existing facility by a modern, more expensive structure, which is known as a betterment. It appears that local interests should bear at least part of the cost thereof.

The corps indicates that its "long-established policy is that betterments in facilities are paid for by the owners." Exceptions to this policy occur, however, because the corps feels that "it is impractical to attempt to saddle owners with the cost of the new facility above the depreciated value of the old."

This is a subject on which Congress may desire to fix a standard policy.

(f) Contingencies

As a matter of general practice, the Corps of Engineers allows itself a leeway of up to 35 percent in its construction-cost estimates for individual projects. This leeway is called "contingencies." The Corps of Engineers has available the finest pool of engineering talent in the world, and has enjoyed almost unlimited financial backing from Congress. Representatives of the corps have told committee counsel that they should be able, and are able, to estimate the total cost of a project within 20 percent (with the qualification that rise in construction costs, and extensions of the project subsequently authorized by Congress, would increase their estimate). However, they point out that such an estimate would not be based upon the *survey report* because insufficient time and money is expended in the preparation of the *survey report* to permit the computation of a sound estimate. Since the *definite project report* is not completed in most cases before initial construction funds are requested they can make such a sound estimate on the basis of the new *planning report*.

Equally important would be the fact that Congress would have available the best data and information upon which to exercise its important function.

VIII. Need for Corps to Furnish Current Information to the Committee at the Time that Appropriations are Being Considered

In their testimony in the spring of each year before the House Appropriations Committee, representatives of the Corps of Engineers furnish cost figures for the projects currently in the civil works program. However, these figures are compiled in July of the preceding year, and are *out of date* when placed before the committee. The figures are 7 or 8 months old, and the cost of projects has increased substantially in that intervening period. For example, the cost of the civil-works program increased $200,000,000 between fiscal year 1951 and fiscal year 1952, and has just tentatively increased $116,000,000 between fiscal year 1952 and fiscal year 1953. In other words, while the civil functions appropriation bill is now pending in the Senate, the cost figures are $116,000,000 greater than stated in the Corps' justification estimates.

It is important to note that again the rise in construction costs is not the sole reason for this increase. To the contrary other factors are discovered as planning progresses, such as errors in original estimates, unforseen conditions, and the need for engineering changes. Three projects will serve to illustrate this situation.

(*a*) *Gavins Point*

This project is not included in the current civil-works construction program. However, it was the subject of testimony in the hearings of April and May 1951 before the House Appropriations Committee (pp. 474–481).

Gavins Point is almost 100 percent power, and the estimated cost of construction in the *survey report* was $15,000,000 based on 1940 prices. It was authorized in the 1944 Flood Control Act on this figure. The corps advised the House Appropriations Committee on April 19, 1951, that the latest cost estimate was $44,900,000. At that time the Office of the Chief of Engineers had in its possession new information from the field, under date of December 1950, estimating the cost to be $55,052,000.

The benefit-cost ratio for this project is very low. Colonel Potter testified on April 19, 1951, that it was 1.1. Shortly thereafter the corps advised the committee's investigative staff it is 1.07.

This project, as pointed out earlier, is so closely interrelated to the large Missouri River projects now under construction that the benefit-cost ratio for Fort Randall will drop to about 1 if Gavins Point is not constructed, and the economic justification for all these projects will decrease. It is, therefore, of vital importance that the House Appropriations Committee have available the latest and best data when it is considering appropriations for not only Gavins Point, but for all these large Missouri River projects.

(*b*) *Central and Southern Florida flood control*

The Corps of Engineers has never furnished the committee with any more accurate cost estimate for the first phase of this project than the estimate of $58,129,000 contained in the *survey report.* (From the estimate of $70,000,000 is deducted local contributions of approximately $12,000,000.)

In April 1951, Colonel Potter again placed this figure before the committee. Shortly prior thereto, the Office of the district engineer

had completed the draft of a sectional *definite project report.* This document considered all the factors in the project and concluded that the estimated cost of the first phase was $93,933,000 (less local contributions).

(c) *McNary Dam*

This project is another illustration of the apparent failure of the corps to furnish Congress with up-to-date information. The committee staff report cites a telephone conversation held in 1945 between the Portland district office and the Office of the Chief of Engineers in Washington. The district office pointed out that housing for workers on the $49,000,000 project would cost $7,000,000. The two offices expressed great concern as to what the congressional reaction would be to this situation, and apparently it was decided to suppress the true facts until the following year. The Office of the Chief of Engineers stated:

> Now if we throw an answer of $7,000,000 (for housing) at them (a committee of Congress) and have a $49,000,000 project, somebody is going to fall dead.

Counsel for the committee has suggested to the Corps of Engineers that the corps circulate its field offices for the latest figures, each year shortly prior to the time that the House Appropriations Committee holds hearings on the civil-works program, so that there will be available to the committee current, up-to-date cost estimates for the projects. The corps is willing to do this, so long as these new, up-to-date figures, are identified separately and distinctly from the figures furnished to the Bureau of the Budget (which are compiled by the Corps of Engineers in July of each year). The corps indicates that it is desirable that only one set of figures be available for consideration by (1) the Bureau of the Budget, (2) the House Appropriations Committee, (3) the House of Representatives, (4) the Senate Appropriations Committee, and (5) the Senate. There may be some merit to this view, but it appears that Congress in taking legislative action on the corps' civil-works program should also be furnished the latest cost estimates. As stated earlier, if the increase in the cost of the program from year to year were solely attributable to the increase in construction costs (as reflected in the ENR index), that would be one thing, but the fact of the matter is that large percentages of increase are attributable to factors which are discovered by the corps in planning and which have direct effect on the ultimate question for congressional consideration which is:

Should funds be appropriated, and if so, how much?

IX. Handling of Public Funds by the Corps of Engineers—Accounting Procedures

The committee's staff made four recommendations with respect to the handling of public funds by the corps, as follows:

1. Recommendation No. 20 of committee staff:

> The Corps of Engineers should encourage the accurate reporting of construction costs by the various district offices.

Corps' position: Concurrence.

2. Recommendation No. 21 of committee staff:

> Strict rules should be adopted by the Corps of Engineers to assure that costs pertaining to military construction, coustruction for the Veterans' Administra-

tion, and to other civil works construction programs will not be charged either directly or indirectly to the civil-works program.

Corps' position: Concurrence.

3. Recommendation No. 24 of committee staff:

Simplified accounting system should be adopted by the Corps of Engineers.

Corps' position: Concurrence.

4. Recommendation No. 25 of committee staff:

The auditing function, insofar as civil works projects are concerned, should be strengthened and rendered more independent than at present. The auditing responsibility should be transferred from the various division offices to the Office of the Chief of Engineers.

Corps' position: Concurrence.

Committee counsel discussed these matters on June 28, 1951, with corps' representatives and with Mr. Harold Pearson, representing the Assistant Secretary of the Army for General Management. Mr. Pearson stated that the corps' civil works functions are *not* audited independently by the Inspector General or by any Army agency other than the corps itself; that the audit of these functions is done internally within the corps with a later audit by the General Accounting Office. In his opinion, this type of audit is not sufficient, and he feels that an external audit of the corps by the Department of the Army is necessary and desirable.

It was pointed out that the Office of Comptroller of the Department of the Army has been functioning for only 2 years, and that of Engineer Comptroller for 1½ years.

The Engineer comptroller, Col. R. E. M. Des Islets, has taken the initiative in these matters. On June 22 and 28, 1951, he issued two directives, both directing in detail the improvement in cost and financial-accounting procedures. (They are printed below in the appendix.) In addition he has been working closely with the Army comptroller in a study of Corps of Engineers civil works. He is strengthening the corps' internal audit, and at the same time has arranged for a regular independent audit by the Army Audit Agency. This will be an Inspector General type audit which means that the corps will continue to keep its own books, but under a continuing outside check.

The present Engineer Comptroller is forthright in his appraisal of the corps' handling of public funds and quick to detect and inaugurate improvements.

X. Reduction in Maintenance and Operation of Projects Whose Need Is Negligible

The committee staff pointed out in its report that certain inland waterways were being maintained even though the amount of traffic using them appeared to have decreased to negligible proportions. The Corps of Engineers concedes that some seven waterways have passed into obsoleteness, or are reaching that stage, and that steps are being taken to terminate Federal expenditures upon them for maintenance and operation. The corps advises that overtures are being made to State and other local interests for the purpose of ascertaining whether they would be interested in taking over such projects, or parts of them.

The Corps of Engineers has available the best information on the annual use or nonuse of inland waterways in the form of a voluminous

document prepared each year by the Chief of Engineers and published by Congress. This work is entitled "Commercial Statistics—Water-Borne Commerce of the United States." The corps is in an ideal position, therefore, to initiate and effect economies in the maintenance and operation of inland waterways, and should do so regularly and vigorously.

XI. Surplus and Obsolete Material

The Corps of Engineers concurred in the committee staff's recommendation that outstanding inventories be reviewed for the purpose of disposing of surplus and obsolete material. A continuing program for this purpose should be set up.

XII. Recommendations of Committee's Investigative Staff and Corps' Position Thereon

In its report of January 23, 1951, the committee's investigative staff made 26 specific recommendations for improvement of the corps' practices. The substance of these recommendations has already been treated, directly or implicitly, and the existing deficiencies will be corrected by the steps suggested herein. However, as a matter of information the 26 recommendations and the corps' position on each are set forth as follows:

Exhibit 11

The Twenty-six Recommendations of Investigative Staff of House Appropriations Committee With Respect to Policies and Procedures of Corps of Engineers, and Position of Corps With Respect to Each Recommendation

I. Estimating costs of projects and furnishing such information to Congress

1. Recommendation No. 1 of committee staff:
   "The Corps of Engineers should in all instances fully and accurately inform the Congress concerning the actual situation with respect to the estimated costs of projects."
   Corps' position: Concurrence.
2. Recommendation No. 4 of committee staff:
   "The estimated costs of projects, when they are presented to the Congress for the purpose of obtaining authorization of the projects, or of obtaining approval of any funds for the design or construction of the projects, should be the estimated costs at the time of presentation as nearly as possible, and the date or period of price experience data should be stated."
   Corps' position: Concurrence.
3. Recommendation No. 12 of committee staff:
   "With respect to the great number of civil works projects previously authorized and which have not yet reached the construction stage, it is recommended that when these projects are to receive construction consideration sufficient funds be appropriated for the preparation of a definite project report for each such project and that a reliable cost estimate be required before construction funds are appropriated."
   Corps' position: Concurrence.
4. Recommendation No. 11 of committee staff:
   "Final construction authorization of civil works projects should be based upon a more advanced planning report than the present survey report."
   Corps' position: Nonconcurrence.
5. Recommendation No. 2 of committee staff:
   "The Corps of Engineers should institute a study of its estimating procedures in the various districts to determine the most effective means of aiding those engineers in their organization who do their estimating."
   Corps' position: Concurrence.

6. Recommendation No. 3 of committee staff:
"District offices of the corps should consolidate their estimating functions in all stages from the earliest preliminary stage to and through the contract estimate stage in an independent branch under and responsible to the Chief of the Engineering Division."
Corps' position: Partial concurrence.
7. Recommendation No. 22 of committee staff:
"The Corps of Engineers should discontinue its present practice of attempting to arbitrarily obligate all possible funds prior to June 30 of each year. Instead of such obligation, there should be presented to the Congress each year a factual picture of the construction costs actually incurred or to be incurred on each project."
Corps' position: Partial concurrence.
8. Recommendation No. 23 of committee staff:
"Consideration might properly be given to the advisability of amending section 627, of title 33, of the United States Code. The amendment proposed would place a dollar limit on the amount of funds which the Corps of Engineers would be authorized to reallocate from one project to another."
Corps' position: Nonconcurrance.
9. Recommendation No. 16 of committee staff:
"Consideration might properly be given as to whether the submittal of fewer projects than heretofore offered annually by the corps for congressional approval of funds should be a future policy in order that each may receive larger appropriations for more expeditious, efficient, and economical construction."
Corps' position: No comment.

II. DETAILS OF ESTIMATING PROCEDURES

1. Recommendation No. 17 of committee staff:
"Consideration might properly be given to the desirability of requiring that the projects authorized before and immediately after the last war, which have not as yet reached the construction stage, be reexamined in light of present-day methods of benefit evaluation before any action is taken toward their construction."
Corps' position: Nonconcurrence.
2. Recommendation No. 18 of committee staff:
"Prior to any reexamination of projects referred to above, it is suggested that the Corps of Engineers and all other Government agencies concerned with river basin planning be urged to agree upon mutually acceptable principles and procedures that would yield comparable estimates of benefits and costs and which could be used to provide a common basis for project formulation and selection."
Corps' position: Concurrence.
3. Recommendation No. 15 of committee staff:
"The Corps of Engineers should extend its studies and reports to include recommendations with respect to power development thus enabling the Congress to consider the advisability of including power development in the original plan."
Corps' position: Concurrence.
4. Recommendation No. 8 of committee staff:
"The Corps of Engineers should take steps to eliminate the many inadequacies in its estimates of the cost of lands. More accurate and reliable acreage computations must be produced; severance damages must be more adequately provided for; and access problems must be given more thorough consideration."
Corps' position: Nonconcurrence.
5. Recommendation No. 9 of committee staff:
"The Corps of Engineers should develop a definite policy concerning the extent and type of clearing necessary in the reservoir area."
Corps' position: Concurrence.
6. Recommendation No. 10 of committee staff:
"The Corps of Engineers together with interested Federal and State agencies must establish a well defined policy concerning the complex fish propagation and preservation problem in the Pacific Northwest."
Corps' position: Concurrence.

7. Recommendation No. 5 of committee staff:
"The corps should afford the relocation portion of projects more careful study and closer attention."
Corps' position: Concurrence.
8. Recommendation No. 7 of committee staff:
"Negotiations with facility owners concerning the plan of relocation should be started early in the life of a project in order to prevent hurried negotiations which usually prove costly."
Corps' position: Concurrence.
9. Recommendation No. 6 of committee staff:
"The Corps of Engineers should establish a clear policy concerning what constitutes betterments in relocations; once established, this policy should be followed without deviation; facility owners should pay for all betterments and improvement afforded them in the relocation of their facilities; and a more positive and realistic attitude should be adopted by the corps when considering the demands of local interests."
Corps' position: Nonconcurrence.

III. MODIFICATIONS OF PROJECTS

1. Recommendation No. 13 of committee staff:
"A curb or control should be placed upon the expansion of a project after its construction authorization and after appropriation of construction funds."
Corps' position: Nonconcurrence
2. Recommendation No. 14 of committee staff:
"It is suggested that the Congress eliminate from future authorizing legislation any reference which may be interpreted as granting the Corps of Engineers permission to make unlimited modifications."
Corps' position: Nonconcurrence

IV. PROCEDURES FOR HANDLING PUBLIC FUNDS

1. Recommendation No. 20 of committee staff:
"The Corps of Engineers should encourage the accurate reporting of construction costs by the various district offices."
Corps' position: Concurrence.
2. Recommendation No. 21 of committee staff:
"Strict rules should be adopted by the Corps of Engineers to assure that costs pertaining to military construction, construction for the Veterans' Administration, and to other civil works construction programs will not be charged either directly or indirectly to the civil works program."
Corps' position: Concurrence.
3. Recommendation No. 24 of committee staff:
"Simplified accounting system should be adopted by the Corps of Engineers."
Corps' position: Concurrence.
4. Recommendation No. 25 of committee staff:
"The auditing function, insofar as civil works projects are concerned should be strengthened and rendered more independent than at present. The auditing responsibility should be transferred from the various Division offices to the Office of the Chief of Engineers."
Corps' position: Concurrence.

V. MAINTENANCE AND OPERATION OF CERTAIN EXISTING PROJECTS

1. Recommendation No. 19 of committee staff:
"Uneconomical conditions of operation of certain navigation facilities should be corrected."
Corps' position: Concurrence.

VI. SURPLUS AND OBSOLETE MATERIAL

1. Recommendation No. 26 of committee staff:
"The Office of the Chief of Engineers should instruct its district offices to take immediate steps to review their inventories and dispose of surplus and obsolete material."
Corps' position: Concurrence.

APPENDIX

TO REPORT OF COMMITTEE COUNSEL

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CI	GENERAL PLANNING AND REPORTS					← Copy of 1st. draft available at O.C.E.						
1	Introduction	ORD	Mar. 46									
2	Basic Laws and Authority	ORD	Mar. 46									
3	Procedure	ORD	Mar. 46									
4	Style and Format of Reports	ORD	Mar. 46									
CII	RIVER AND HARBOR PLANNING											
1	Preliminary Examination	ORD	Mar. 46									
2	Survey	ORD	Mar. 46									
3	Definite Project	ORD	Mar. 46									
CIII	FLOOD CONTROL PLANNING											
1	Preliminary Examination	ORD	Mar. 46									
2	Survey	ORD	Mar. 46									
3	Definite Project	ORD	Mar. 46									
CIV	RIVER AND HARBOR REPORTS											
1	Examination and Review	ORD	Mar. 46									
2	Survey and Review	ORD	Mar. 46									
CV	FLOOD CONTROL REPORTS											
1	Examination and Review	ORD	Mar. 46									
2	Survey and Review	ORD	Mar. 46									
CVI	DEFINITE PROJECT REPORT	ORD	Mar. 46									

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						← Copy of 1st draft available at OCE						
CVII	RECREATION REPORT	ORD	Mar. 46									
CVIII	BASIS OF DESIGN REPORT	ORD	Mar. 46									
CIX	INFORMATION PAMPHLETS											
CX	SURVEYS	LMVD	Oct. 45									
CXI	MAPS	LMVD	Oct. 45									
CXII	BENEFITS											
CXIII	COST ESTIMATES											
1	Reports Estimates	OCE	Oct. 46									
2	Government Estimate of Fair and Reasonable Cost to Contractor	OCE	Oct. 46									Final draft complete Field Distr 6/16/49
3	Government Estimate of Cost, Government Plant or Hired Labor Basis	OCE	Oct. 46									
CXIV	HYDROLOGIC & HYDRAULIC ANALYSIS											
1	Introduction	OCE	Jan. 46									
2	Reservoir Projects	OCE	Jan. 46									
3	Levee & Channel Improvements	MRD	May 46									

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CXIV	Continued					← Copy of 1st draft available at OCE						
4	Storm Study Program Procedure	OCE	Jan. 46									
5	Flood Hydrograph Analyses and Computation	OCE	Dec. 47									2d Edition Compl. Field Distrib 6/26/
6	Reservoir Capacity and Outlet Requirements	OCE	Feb. 47									
7	Spillway Capacity and Freeboard Reqmts. for Dams	OCE	Jan. 46									
8	Routing of Floods Through River Channels	OMD	Feb. 46									
9	Computation of Backwater Curves in River Channels	OCE MRD	July 48 Feb. 46									Coin. Revised. Field Distr. 12/10/
10	Interior Drainage	OCE	Nov. 46									
CXV	SEDIMENTATION & DEBRIS INVESTIGATION	OCE	Jan. 48									
CXVI	HYDRAULIC DESIGN											
1	Special Flood Control Channels	NAD	Nov. 46									
2	Reservoir Outlet Structures	MRD	June 47									
3	Spillways	SWD	June 47									
4	Navigation Locks	UMVD	June 47									
5	Navigation Dams	UMVD	June 47									
6	Surges in Canals	MRD	June 46									Distr. 8/2/49
7	Tidal Hydraulics and Salt Water Problems	NAD UMVES	June 46									
8	Waves and Wave Pressure	UMVES	June 46									
CXVII	HYDRO POWER											
1	Introduction	OCE	June 45									
2	Determination of Power Capacity and Energy Output	OCE	June 45									

CHAPTER	PAGE
XIII	Continued
4	Steam Sandy Irrigation Projects
5	Pumping Plants and Electric Power
6	Reservoir Capacity and Storage Requirements
7	Relative Quantity and Economic Results for
8	Duties of Steam Pumping Plants
9	Conclusions and Recommendations
10	Irrigation Practices
XIV	DESCRIPTION & IRRIGATION
XVI	ACTIVITIES UNDER
1	Special Field Control
2	Reports Giving Progress
3	Outlines
4	Examining Lands
5	Irrigation
6	Surveys for
7	Canal Systems and Dam Sites
8	Water and Soil Problems
XVII	FIELD PARTY
1	Party
2	Organization of

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CXVII	Continued				← Copy of 1st. draft available at O.C.E.							
3	Value & Cost of Hydro Power	OCE	June 45									
4	Summary	OCE	June 45									
CXVIII	SUBSURFACE INVESTIGATION											
1	Geological Investigations	OCE	July 47 Jan. 48									Being Revised Distr. Sept. 1944
2	Geophysical Explorations	OCE	Jan. 48									2d Edition Distr. Jan 1949
3	Soils Investigations	OCE	Jan. 48									Being Revised Distr. Oct. 1945
4	Availability of Local Construction Materials	SED	Oct. 45									
CXIX	SOILS MECHANICS DESIGN											
1	Seepage Control	MED	Apr. 46									
~~2~~	~~Ground Water Control~~	~~SED-OMCE~~	~~Apr. 46~~									
~~3~~	~~Stability of Foundations~~	~~MED~~	~~Apr. 46~~									
± 2	Stability of Slopes and Foundations	LMVD OMCE	Apr. 46									
± 3	Bearing Capacity of Foundations	MED	Apr. 46									
± 4	Settlement Analysis	MED	Apr. 46									
± 5	Earth Pressures	MED	Apr. 46									
CXX	RECOMMENDED PRACTICE FOR CONCRETE AND REINFORCED CONCRETE	CEE	Nov. 46									Being Revised Distr. Aug. 1944
CXXI	STRESSES AND CRITERIA FOR STRUCTURAL DESIGN											
1	Working Stresses for Hydraulic Structures	OCE	Nov. 46									2d Edition Distrib. 2/23/48
2	Design Criteria											

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CXXII	CONCRETE DAM DESIGN					← Copy of 1st. draft available at O.C.E.						Preparation of part by SPD cancelled 10/
1	General											-
2	Gravity Dams	OED	Oct.47									
3	Arch Dams											
4	Buttress Dams											
5	Special Type Dams											
CXXIII	EARTH DAM AND LEVEE DESIGN	ED MED	Oct. 48									
CXXIV	SPILLWAYS AND OUTLET WORKS	SED	Jan. 48									
CXXV	WALL DESIGN											
1	Flood Walls	OCE OED	June 49 Oct. 48									Being revised. Distrib. 5/5/48
2	Retaining Walls	OCE	Jan. 48									Out of print Distr. Aug. 1945
CXXVI	NAVIGATION LOCK AND DAM DESIGN	MED	Oct. 48									
1	Locks											
2	Lock Masonry											
3	Lock Gates											
4	Lock Valves											
5	Emergency Closures for Locks											
6	Navigation Dams											
7	Navigation Dam Masonry											
8	Movable, Non-Navigable Dam Gates											
9	Movable Navigable Dam Closures											

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CXXVI	Continued				← Copy of 1st. draft available at O.C.E.							
10	Emergency Closures for Dams											
CXXVII	CREST & HEAD GATES											
1	General	[illegible]	Feb. 47									
2	Tainter Gates	OCE	Jan. 47									Being revised
3	Vertical Crest Gates	[illegible]	Oct. 45									
4	Drum Crest Gates	[illegible]	Aug. 45									
5	Roller Gates	[illegible]	Oct. 45									
CXXVIII	CONTROL GATES & VALVES FOR OUTLET WORKS											
1	General	OCE	Feb. 47									
2	Slide Gates	[illegible]	Oct. 45									
3	Tractor Gates	[illegible]	June 47									
4	Ring Follower Gates											
5	Ring Seal Gates											
6	Valves	ORD	Nov. 47									
CXXIX	DESIGN OF MISCELLANEOUS STRUCTURES											
1	Tunnel Timbering and Lining	ORD	Oct. 45									
2	Conduits, Culverts and Pipes	OCE	Nov. 46 Jan. 48									Rel. - Revised Distrib. 10/14/48
3	Construction Housing	NCD	Mar. 47									
4	Breakwaters	[illegible]	Oct. 45									
5	Slope Protection	OCE	Jan. 47									
6	Piling	[illegible]	Apr. 48									

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CXXX	HYDRO ELECTRIC POWER PLANTS				← Copy of 1st draft available at O.C.E.							
1	General Requirements	[illegible]	Apr. 46									Distrib. 6/11/48
2	Architectural Design	[illegible]	Apr. 46									Distrib. 10/6/48
3	Structural Design	[illegible]	Apr. 46									
4	Mechanical Design	[illegible]	Apr. 46									
5	Electrical Design	[illegible]	Apr. 46									
CXXXI	PUMPING STATIONS											
1	Introduction & General Considerations	[illegible]	June 46									
2	General Principles of Design & Layout	[illegible]	June 46									
3	Architectural Design	[illegible]	June 46									Distrib. 3/29/48
4	Structural Design	[illegible]	June 46									Distrib. 3/31/48
5	Mechanical & Electrical Design	[illegible]	June 46									
CXXXII	ELECTRICAL AND MECHANICAL DESIGN											
1	Electrical Systems	[illegible]	Nov. 46									
2	Electrical Materials and Equipment	[illegible]	Nov. 46									
3	Mechanical Design	[illegible]	Nov. 46									
4	Accessory Equipment	[illegible]	Nov. 46									
5	Metals	[illegible]	Nov. 47									
CXXXIII	BEACH EROSION	BEB	June 46									Distrib. 11/1/47
CXXXIV	CONTRACT OPERATION PROCEDURES											
1	Assistance to Contractors											

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CXXXV	Continued					← Copy of 1st draft available at OCE						
2	Change Orders											
3	Inspection											
CXXXV	FOUNDATION GROUTING	OCE	Aug. 47									Being revised
1	Grouting Planning											Distrib'd Apr 49
2	Equipment											Distrib. 6/11/49
3	Field Technique and Inspection											
CXXXVI	RESERVOIR REGULATION	OCE	Jan 48									Preliminary draft distributed as incl. to Engr. Bulletin No. 48-5
	Painting											

Development of Policies and Procedures of the Corps of Engineers for the Planning of Civil Works Projects

1. The Corps of Engineers, Department of the Army, has been engaged in the planning and construction of civil-works projects since 1824. This work was largely confined to navigation improvements, with the execution of flood-control activities on the Mississippi and Sacramento Rivers and on Lake Okeechobee in Florida, and with the execution of the "308 Surveys" hereafter described, until the passage by Congress of the first general Flood Control Act in 1936.

2. Policies and procedures utilized by the Corps of Engineers in the planning of civil-works projects have undergone constant modification and improvement as the Federal program of water-resource development has expanded in scope and complexity, and on the basis of experience gained through the years. At the present time planning of civil-works projects begins with the preliminary examination designed to determine whether a detailed survey should be made; continues through the survey stage, resulting in reports and recommendations to Congress for authorization; thence to the preparation of definite project studies and reports, when planning funds are appropriated after authorization; and, culminates in the preparation of detailed plans and specifications for construction of the works. This statement presents the development of these planning procedures, the improvements which have been made, and those which the Corps of Engineers intends to accomplish.

I. EARLY LEGISLATIVE BASES

3. Federal interest and participation in flood control is an outgrowth of the earlier Federal responsibility for navigation, derived basically from the commerce clause of the Constitution. This Federal flood-control activity began in the alluvial valley of the Mississippi River and took definite form with the establishment of the Mississippi River Commission by Congress in 1879. This commission is still in active existence with jurisdiction over the planning and execution of flood control and navigation work on the lower Mississippi River. The California Debris Commission was established by law in 1893 and was charged with preparing plans for control of mining debris and for preservation of the navigable channel of the Sacramento-San Joaquin Rivers of California. The Board of Engineers for Rivers and Harbors was established by law (Sec. 3 of the River and Harbor Act of 1902) to consider and make recommendations on navigation improvements investigated and reported on by the Corps of Engineers, under the procedures established by Congress for study of such improvements.

4. In the River and Harbor Act of March 1, 1917, Congress recognized the growing national concern with flood control, and its close relationship with navigation and other water-resource developments. In that act Congress prescribed that existing law relating to improvements of rivers and harbors (for navigation) should apply, so far as applicable, to flood control. This among other effects, placed flood control generally under the jurisdiction of the Corps of Engineers. In addition the same act specified that examinations and surveys for flood control should be comprehensive in scope and include consideration of the development of water power and such other uses "as may be properly related to or coordinated with the project." Although subsequent river and harbor and flood control legislation has clarified and expanded this language it remains the basic authority and directive for the comprehensive water-resource studies made by the Corps of Engineers.

II. THE "308 SURVEYS"

5. A broader factual basis for planning a Federal program of flood control and water-resource development was made possible when Congress in the River and Harbor Act of 1927 first authorized the prosecution by the Corps of Engineers of the comprehensive river-basin studies known as the "308 Surveys" (so-called because authorization was based on House Document No. 308, 69th Cong., which under the authority of the River and Harbor Act of 1925 indicated the surveys required and estimated their cost). The stated purpose of these surveys was to formulate general plans for the improvement of our rivers for navigation, power development, flood control, and irrigation. As a result of this authority the Corps of Engineers over the decade following 1927 completed surveys and reports

on some 200 rivers including essentially all of the major river basins of the United States. The River and Harbor Act of August 30, 1935, authorized the Chief of Engineers to keep these studies up to date to take into account changes in economic factors and accumulated engineering data. These "308 Surveys" constituted comprehensive studies of the rivers of the United States designed to present an inventory of water resource problems and possibilities of development. The plans presented were general in nature and, together with cost estimates, were based upon reconnaissance types of surveys and available data. They were not originally intended as a basis for authorization of Federal improvements as they preceded the adoption by Congress of flood control as a Federal activity as well as the present Federal interest in development of hydroelectric power. The "308" reports and estimates, however, were the best available data on such improvements and were utilized by Congress as a factual basis for the initial general Flood Control Act of 1936. They also provided the basis of the plan of the Tennessee Valley Authority which was authorized by Congress. In addition they provided a reservoir of emergency relief projects accomplished with Federal funds during the depression in the early 1930's; served as a major source of information for the National Resources Board in 1934; and are still utilized by all Federal agencies concerned with water-resource development.

III. SUBSEQUENT TO FLOOD CONTROL ACT OF 1936

6. The first general Flood Control Act of 1936 authorized the construction of a large number of specific flood-control projects, largely on the basis of plans and estimates presented in the "308 Surveys," and authorized numerous additional preliminary examinations and surveys. Before this authorized program could be placed under way, the flood of January 1937 caused heavy damage in the Ohio River Basin, and severely tested the works which had been constructed in the lower Mississippi Valley. Because of the extreme urgency of the situation emphasized by this flood, Congress in February 1937, requested the Corps of Engineers to review the situation and devise plans for protective works at the earliest practicable date. In order to meet this requirement the Corps of Engineers made a rapid review of its "308" studies for the Ohio and other major basins tributary to the Mississippi River, in the light of the most recent information; and a report was completed and submitted to Congress by the President on April 28, 1937. The emergency nature of this report and the short time involved precluded detailed investigations and precise estimates for each project. This report, however, presented over-all plans of improvement which were fundamentally sound and served as the basis for the river-basin plans which were authorized in the Flood Control Act of 1938.

7. After 1938, however, planning for civil-works projects as a general rule followed the pattern established by Congress for navigation improvements with necessary modifications to encompass the new field of flood control and the various aspects of water-resource development allied with control of floods. Improvements and changes were initiated as early as 1936 and have been continuous.

IV. PRELIMINARY EXAMINATIONS

8. When a preliminary examination and survey is authorized by Congress, it is immediately assigned by the Chief of Engineers to the division engineer, who in turn assigns it to the district engineer in whose district the area is located. The preliminary examination is a brief study, made at minimum cost largely on the basis of available data, to determine the nature and extent of the problem, and possible remedial works, with a preliminary estimate of probable benefits, and preliminary opinion as to costs and as to whether a more detailed study should be made. The district engineer, in order to ascertain public opinion, regarding the proposal, holds an open public hearing at which the views of all interests, both proponents and opponents of the proposal, are obtained. Having thus developed the desires and feelings of the local citizens, the district engineer makes his study. The results of that investigation are then sent forward to the Chief of Engineers, who in turn refers them to the Board of Engineers for Rivers and Harbors for study and recommendation as to whether sufficient merit exists in the project to warrant a more costly survey. In case the project is not deemed feasible from the standpoint of either engineering or economics, an unfavorable

report is sent to Congress with a recommendation that no further action be taken. If a further survey is warranted, division and district engineers concerned are instructed to proceed with such a survey and report, subject to availability of funds. It is interesting to note that about 50 percent of all projects covered by preliminary investigation and surveys are found not justified.

V. SURVEYS AND SURVEY REPORTS

9. Surveys and survey reports on civil-works projects are designed to develop the engineering and economic soundness of the improvements under consideration as a basis for recommendations by the Chief of Engineers to the Congress, and for action by the Congress on authorization of such projects for undertaking by the Federal Government under existing law.

10. As indicated previously, the policies, procedures, and instructions, prior to 1936, under which the Corps of Engineers carried out surveys and planning for civil works, were largely those which had developed in the planning of navigation improvements. Investigations under the "308 Surveys" had broadened the scope of these investigations to include consideration of flood control, hydroelectric power, irrigation and other water-resource problems; and further attention had been given to these matters in consideration of emergency relief projects during the depression years of the 1930's. After 1936 continuous action was taken to improve and clarify survey policies and procedures as set forth in the following paragraphs:

Improvements accomplished and underway

11. During the year immediately following 1936 there was a large amount of correspondence between the Office, Chief of Engineers, and division and district offices, on surveys and planning for flood-control projects. Many districts developed from experience their own methods of engineering and economic analysis. There was wide interchange of this experience among districts, and it was soon realized that procedures followed in the past for navigation reports needed amplification and improvement to meet the new problems involved in flood control and multiple-used developments.

12. By River and Harbor Circular Letter No. 39 of June 9, 1936, the Chief of Engineers issued initial instructions for preparation of flood-control surveys and reports, prescribing the basic engineering and economic analyses that would be required. This was followed by a long series of instructions by circular letter in 1937 and 1938, covering the following matters:

Cooperation with Department of Agriculture	January 1937.
Reports on recreational boating and fishing projects	March 1937.
Coordination with Federal Power Commission	May 1937.
Local cooperation under act, 1936	August 1937.
Cooperation with Bureau of Public Roads	October 1937.
Coordination of views of Federal agencies	February 1938.
Coordination with Water Resources Branch, Geological Survey	June 1938.
Analyses of economic justification	August 1938.
Conservation of fish and wildlife	August 1938.
Separate estimates on relocations and lands	November 1938.

These early instructions, while not complete according to present-day standards, showed initial recognition of many of the more difficult problems involved in planning for civil-works projects.

13. The fundamental importance of basic hydrological studies was recognized in 1938, when experts in this field were assigned to the Office, Chief of Engineers, and the present cooperative hydrological and meteorological studies were initiated with the Weather Bureau.

14. On August 11, 1939, by River and Harbor Circular Letter No. 42, all division and district engineers were furnished a general outline of procedure for reports on multiple-use projects, which had been approved by the Bureau of Reclamation, the Bureau of Agricultural Economics, and the National Resources Planning Board, as well as by the Corps of Engineers. This was an initial step toward Federal interagency coordination and uniformity of reporting among the agencies engaged in water-resource development.

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15. By River and Harbor Circular Letter No. 43, of August 14, 1939, instructions on analysis of economic justification of flood-control projects were revised and expanded to take into consideration the experiences of the various field offices in this matter; and to secure more uniform reporting practices. It should be noted that this was an entirely new field and that there were essentially no textbooks or literature for guidance. Consequently, guide lines and procedures had to be established on field experience with actual investigations.

16. During 1940 further instructions and modification of the survey-report procedure were issued by the Chief of Engineres to:

(*a*) Provide for inclusion in reports, or with reports, of views of other agencies.

(*b*) Specify relationship of flood magnitudes to evaluation of flood-control benefits.

(*c*) Reduce the interest rates to 3 percent on Federal funds and to 4 percent on non-Federal funds for use in economic analysis.

17. As a result of negotiations between the Corps of Engineers and the Departments of Agriculture and Interior, the so-called tripartite agreement was reached in 1939 between those agencies on coordination of procedures of water resource planning and development. This was the forerunner of the later four-party agreement of December 1943, which included the Federal Power Commission and led eventually to voluntary formation of the present Federal Inter-Agency River Basin Committee which now also includes the Department of Commerce and the Public Health Service of the Federal Security Administration.

18. In October 1943 the President by section 4 of Executive Order No. 9384, required that reports on civil-works projects, including those for flood control, be submitted to the Bureau of the Budget, prior to transmission to Congress for review as to their relationship to the President's program. Accordingly, completed reports are submitted to the Budget for such a review; and upon completion of that review are returned to the Department of the Army for transmission to the Congress.

19. The Flood Control Act of 1944 (Public Law 534, 78th Cong.) declared it to be the Federal policy to recognize the rights and interests of the States in development of the rivers and streams within their borders, and in the control and utilization of those waters. That legislation provided for close coordination in the planning stages of water-resource projects; and provided that the Chief of Engineers transmit a copy of his completed report on any improvement to the Governor of each affected State for comments, which accompany the reports when they are transmitted to Congress. Under this procedure the affected States are able to participate in the planning of necessary improvements and have full opportunity to register their approval or disapproval of final recommendations. In practice the States wield a substantial influence in these matters, and it is very seldom that recommendations are made to the Congress by the Chief of Engineers which do not have the concurrence of the affected States.

20. The Flood Control Act of 1944 also provided for coordination between the Corps of Engineers and the Department of the Interior whenever a proposal involves the control of waters which rise in whole or in part west of the Ninety-seventh Meridian; and an act approved August 14, 1946 (Public Law 732, 79th Cong.) provides specifically for cooperation with the States and with the Fish and Wildlife Service with a view to preventing loss and damage to fish and wildlife resources. Under these laws, and under the voluntary Federal inter-agency arrangements mentioned previously, the Corps of Engineers coordinates its survey and planning activities with 13 bureaus of 4 other Federal departments and with the Federal Power Commission, as well as with the Department of the Navy, Atomic Energy Commission, and with the international commissions when boundary waters are involved.

21. In addition to the steps previously described, which have been taken by the Corps of Engineers to improve the survey report, some 67 engineer bulletins were issued to field offices between 1936 and 1947 setting forth approved up-to-date engineering practices applicable in many cases to preparation of plans in survey reports as well as in later construction stages.

22. Immediately after World War II the Corps of Engineers undertook a review of its procedures on civil-works projects in the form of a complete revision of Orders and Regulations, to incorporate and bring together in convenient and usable form the various instructions which had accumulated over past years, as well as the most recent legislative and inter-agency requirements. This was accomplished and issued under date of September 1, 1947. Chapter V, part II Civil Works, section 2, General Procedure for Examinations, Surveys and Reviews, provides a very complete guide to reporting officers and employees at field

offices for the preparation of survey reports. Numerous revisions have been made since 1947 to incorporate current experience. This part of Orders and Regulations covers project formulation, estimates of cost, consideration of relocations and lands, local cooperation, coordination with other agencies, economic analysis of projects, and numerous other steps involved in preparation of a survey report.

23. Beginning in April 1946 the Federal Inter-Agency River Basin Committee established a subcommittee on benefits and costs to study practices of the various agencies concerned with water-resource development, with a view to formulating mutually acceptable principles and procedures for determining benefits and costs of water-resource projects. The Corps of Engineers has participated and will continue to participate fully in this undertaking. The publications of this subcommittee have been made available to field offices of the Corps of Engineers and are now being utilized, except with respect to procedures on which agreement has not yet been reached at an inter-agency level.

24. During the war period cost estimates in survey reports were based on prewar price levels as representing the latest stable level for estimating. By letter of April 25, 1946, division and district engineers were instructed to use a current price basis in survey reports and other estmates.

25. The Flood Control Act of 1944 included major drainage improvements as a part of flood control, which widened the field of flood-control investigations and introduced the element of improvement of agricultural lands by control of water supply. After careful study of the first investigations coming under this phase of the flood-control activities, the Corps of Engineers and the Department of Agriculture reached agreement on division of responsibilities in this field by a memorandum of understanding dated June 1, 1948. This memorandum, together with instructions for investigations and reports on major drainage improvements, was issued by the Chief of Engineers by letter of November 29, 1948. This letter, among other things, set forth guides for determining and recommending local cooperation in these improvements.

26. In May 1948 instructions were issued by the Chief of Engineers requiring that planning, design, and cost estimates and economics of projects being recommended in survey reports be reviewed in district offices by the staff of the Office of the Chief of Engineers, and providing that reporting officers advise the Chief of Engineers by letter when such plans and estimates are available for review The purpose of this procedure is to insure that the most experienced personnel in the Corps of Engineers are made available to review the reports prior to completion, and to make available to district offices the broader experience in design, cost, and economics available in the Office, Chief of Engineers. As a result, teams of experts from the Office, Chief of Engineers, now visit district offices and confer during the preparation of survey reports. The size and composition of these conferences depend upon the complexity and scope of the projects involved. This procedure has proved to be beneficial, is now provided for in Orders and Regulations, and will be continued.

27. In order to approach uniformity in division and district organizations and to assure adequate application of practices, a study was initiated in 1948 of all corps organizations. As a result of this study a revision to Orders and Regulation was issued in June 1950 establishing the functional responsibilities of each branch of a division and district office. Of particular significance are the responsibilities stated for the engineering division of district offices, which were defined to accomplish adequacy of designs and cost estimates. To insure that the same experienced engineers who prepare the final construction designs and cost estimates are utilized for this work in the Survey Report and Definite Project Report stages, the respon sibilities in the district office for designing and cost estimating have been placed in one branch, the Design Branch, the head of which reports direct to the Chief of Engineering Division. The duties of this branch, among other (see O & R, par. 1005.13 (c), issued June 1, 1950), include the following:

(*a*) Prepares analysis of design and final design for all construction projects as required, except for such levee and embankment design as is performed by the Foundation and Materials Branch

(*b*) Prepares and issues necessary engineering drawings, plans, and specifications for all construction and maintenance work

(*c*) Prepares designs, quantity computations, and cost estimates for all proposed work, including those required for preliminary examination, surveys, and definite project reports;

(*d*) Prepares Government estimates for all work except maintenance work, used for comparing reasonableness of bids received;

(*e*) Prepares budget and cost estimates for new work pertaining to functions of the engineering division for inclusion in the annual report;

(*f*) Participates in preparation of preliminary examination reports, survey reports, reviews of reports, and definite project reports.

28. Division engineers were specifically instructed by the Assistant Chief of Engineers for Civil Works at a conference in Washington on July 19, 1951, to insure that this consolidation of estimating functions was made effective in all districts.

29. In August 1949 the procedure for handling completed preliminary examination and survey reports was changed to require review by the Civil Works Division of the Office, Chief of Engineers, to insure the adequacy of designs, cost estimates, and economics contained in the reports. Previously, these reports had been reviewed only by the Board of Engineers for Rivers and Harbors. The effect of this change was to provide that those engineers of Civil Works Division in daily contact with project development could apply their experience in the survey report stage, and that engineers and sections charged with review in later definite project and construction stages would have a continuity of responsibility throughout the development of project plans.

30. The importance of proper consideration of land requirements for civil-works projects has become more and more evident as experience with the program has accumulated. Original instructions regarding real estate issued in 1938 pertained largely to the procedure for acquisition after authorization. A revision of Orders and Regulations issued in September 1949 now stresses the relationship of land requirements to civil-works projects and provides that reporting officers avail themselves of the services of real-estate personnel in division and district offices on the real-estate features of survey reports.

31. After extensive study by the Board of Engineers for Rivers and Harbors and the Office, Chief of Engineers, instructions were issued by circular letter on February 3, 1950, standardizing the method of evaluating the benefits of small boat harbors and of determining a proper degree of local contribution. This was necessary because of the many problems which had arisen in connection with investigations of small harbors for recreational craft and the various approaches to this problem which had developed in various district offices. Modified instructions on this matter were issued in March 1951.

Survey report improvements to be accomplished

32. The Corps of Engineers intends to inaugurate the following actions in order to improve further the completeness and accuracy of survey reports:

(*a*) Make every effort within the limits of available funds to complete the initial sections of the Engineering Manual for Civil Works which deal with matters pertinent to survey reports. These will in effect be an assembly of policies, procedures and practice now prescribed and available to the field offices in orders and regulations, circular letters, and various bulletins; and will have the effect of making this material available to field offices in a more readily usable form. The sections on cost estimating will similarly assemble present instructions and check lists now in use; and will emphasize the need for accurate and reliable estimates of costs.

(*b*) Issue more detailed instructions regarding consideration of relocation requirements in survey reports, to insure that careful consideration is given to recent experience with this difficult phase of the civil works program.

(*c*) Complete its review of the pamphlet entitled "Proposed Practices for Economic Analysis of River Basin Projects" dated May 1950 as prepared by the Inter-Agency Subcommittee on Benefits and Costs. The Corps of Engineers is participating fully in the solution of the few major problems which remain to be reconciled.

(*d*) Complete and issue further instructions clarifying the degree of local cooperation to be required where substantial land enhancement or increase land use values result from Federal flood control works.

(*e*) Complete present studies of revised methods of analysis of Federal hydroelectric power projects with reference to proper treatment of interest rates, insurance charges, and taxes payable by private enterprise on similar projects.

(*f*) Complete present study of justification for improvement of fishing harbors. A pilot study of the Chesapeake Bay area is now being made under the jurisdiction of the Board of Engineers for Rivers and Harbors.

(*g*) Continue studies under the Beach Erosion Board for determining acceptable methods of evaluating benefits, including recreation, of shore and beach protection.

VI. DEFINITE PROJECT STUDIES AND REPORTS

33. The present definite project procedure was established administratively by the Corps of Engineers in 1936 after enactment of the Flood Control Act of that year. It is not a procedure or report required by congressional legislation. Definite projects studies and reports resulting therefrom are prepared with planning funds appropriated by Congress after authorization of projects.

34. Most of the civil works authorized by Congress prior to 1936 were navigation improvements involving dredging or relatively small locks and dams, breakwaters, and other structures for which construction procedures and designs were generally standardized. With the advent of Federal participation in flood control improvements on a Nation-wide scale the projects involved became more complex from an engineering standpoint and authorizations resulted in many projects of great magnitude. Furthermore, the projects authorized in the 1936 and 1938 acts were based on 308 survey plans and estimates, or on plans and estimates based on surveys which were in less detail than those required by present procedures. It was considered necessary, therefore, that additional studies and reports be prepared on these projects after authorization to establish more definitely the project that would be constructed under the authorization together with up-to-date cost and economic status.

35. Accordingly, this procedure was initiated by the Corps of Engineers by issuance of River and Harbor Circular No. 45 on June 26, 1936. The instructions contained in this letter covered the essential major points involved but were general in nature. The definite project report required under these instructions was a concise summary of the project, and these studies and reports have been greatly expanded under subsequent instructions to meet the requirements of preconstruction engineering planning.

36. The first definite project procedure for flood-control projects which required reports approaching their present scope and engineering detail was established by the Chief of Engineers by River and Harbor Circular No. 19 of April 12, 1939. This letter stated the basic purpose and requirements of the definite project report as follows:

" 'A definite project' report is intended to present to the Chief of Engineers concise and up-to-date information on an authorized project or a project that can be selected for construction under a general authorization. Studies made in connection with the preparation of the definite project report have served in many cases to crystallize a plan of improvement which theretofore had been only of a general nature. * * * The report should furnish sufficient data to enable this office to review and approve the basic factors that will affect the final design, while the project is still in the preliminary stages of development. The plans and estimates of cost should be in sufficient detail to enable this office to make a general check of the adequacy of the design and the estimate. Since these reports often form the basis for the selection of the projects which can be accomplished within prescribed limits of expenditure, it is important that the study of foundations, hydrology, and other design factors be carried far enough to avoid the necessity for subsequent fundamental changes of plan which will result in material increases in the estimated cost."

The studies thus prescribed in 1939 also provided for an economic study.

37. In March 1943 the definite project procedure was extended to river and harbor (navigation) improvements; except that further instructions by circular letter No. 3376 of October 23, 1944 specifically stated that "definite project reports need not be prepared for dredging and other conventional types of projects which do not include various structures and where the work is of the same general nature throughout."

Improvements accomplished

38. The definite project procedure essentially in its present form was set forth in the revision of Orders and Regulations prepared after World War II and issued in September 1947. These instructions provided for preparations of either a "brief" or "comprehensive" type of report depending on the type, size and complexity of the project. Supplemental instructions on preparation of definite project reports were issued by letter of August 12, 1949, which provided for the following:

(*a*) Submission of sections of definite project reports so that construction of initial phases of projects could be started before completion of detailed plans for later phases.

(*b*) Preparation of a general section of the definite project report which would serve to set forth the project as a whole and coordinate the various

sectional parts covering hydrology, geology, power installations, land acquisition, and other matters.

(*c*) Inclusion of a section of land acquisition to replace the real estate planning report formerly prepared.

The foregoing changes were incorporated into orders and regulations in November 1950 and all previous instructions were revised and clarified in that change.

39. Meanwhile changes to orders and regulations in 1949 and 1950 prepared by the Real Estate Division of the Office, Chief of Engineers, were issued to expand and clarify previous instructions regarding land requirements, costs, and acquisition to be presented in the real-estate section of the definite project report. These instructions comprising some 27 pages of published material constitute a valuable addition to the definite project procedure.

40. The following actions have also been taken to improve the engineering practice which is basic to preparation of definite project studies as well as to accomplishment of construction:

(*a*) Twenty-three engineering manuals for civil works have been issued to the field offices since 1944. These manuals cover approved criteria in the fields of hydrology, hydraulic design, subsurface investigations, concrete practice, structural design, electrical and mechanical design, foundation grouting, and provide approved design criteria for certain structures. Some 73 other engineering manuals covering criteria for design of other phases of civil works and cost estimating are now in process of preparation.

(*b*) Fifty-five engineer bulletins have been issued to the field offices since 1947. These bulletins cover suggestions for improvement of engineering and construction procedures in the field offices.

(*c*) Twenty guide specifications for civil works have been issued to field offices since 1945. These are intended to facilitate preparation of specifications throughout the 43 field offices on a uniform and acceptable basis; and to obtain the lowest possible bids from manufacturers, suppliers, and contractors. The guide specifications issued cover diverse phases of the civil-works construction. Some additional 92 guide specifications are now in process of preparation.

41. The definite project procedure now being followed is designed largely to provide adequate preconstruction planning to develop definitely the project that will be built and provide a sound engineering basis for the preparation of contract plans and specifications. In this process, it may naturally be expected that more accurate estimates of cost can be prepared than was possible during the survey report stage of project development. The latest revision in procedure permitting submission of sections of reports is designed to reduce engineering planning costs, maintain uniformity in engineering workloads in district offices and to enable further delegations of authority to district and division engineers in the approval of final plans and specifications. The definite project procedure now in force is considered to be adequate and no immediate changes are in prospect except normal modifications to effect economies and more efficient prosecution of the work.

42. Programs of technical investigation in structural, electrical, mechanical, and hydraulic engineering and in the fields of concrete, hydrology, hydrometeorology, geology, soils mechanics, sedimentation, and instrumentation have been under way since 1930. Since World War II, these programs have been intensified, including several in cooperation with other Federal and nongovernmental agencies. In addition to experimental and model studies on individual projects, the objective of these programs is to improve engineering design criteria throughout the 43 district offices in order to achieve further economy in the expenditure of construction funds. The results of these programs are disseminated in the form of laboratory reports, bulletins, and technical memoranda, of which over 500 have been issued since 1930.

SUMMARIES BY COMMITTEE COUNSEL OF ILLUSTRATIVE PROJECTS

RED LAKE AND CLEARWATER RIVERS, MINN.

Authorized by Flood Control Act of December 22, 1944, based on survey report cost estimate of $902,940 (using 1940 price level).

The engineers requested construction money for fiscal year 1947, in advance of the completion of the definite project report. The Bureau of the Budget did not recommend construction money, and the engineers in fiscal year 1947 allocated planning money from a lump sum.

The definite project report was completed on May 14, 1947, and revisions were made therein and finally approved on July 10, 1947. This was shortly prior to the beginning of fiscal year 1948 at which time the engineers estimated $2,316,000, or an increase of two and one-half times over the survey report estimate.

The engineer of the committee staff advises that the definite project report indicates generally favorable conditions in practically all features of the project; i. e., earth work easy; construction materials available; relocation work easy; recreation space not needed.

It is significant to note that the authorization estimate was $902,940 and that increase is attributable to (*a*) structural and engineering modification, $284,000, (*b*) unforeseen conditions, $773,000, and (*c*) inadequacies, $350,000, amounting to $1,307,000, an increase of over 100 percent of the authorization estimate. We do not know how much of the increases in these three categories were covered by the definite project report, but it is apparent that completed planning prior to the request for the construction funds will pick up such increases, or the bulk of them.

The increased cost of relocations is quite large. With the relocations program only 3 percent completed, the cost increase is 1,034 percent (an increase from $28,680 to $325,230, or $196,550).

ISABELLA RESERVOIR

Authorized in December 1944 at an estimated cost of $6,800,000. This estimate was based upon a report to Congress, printed as House Document No. 513. Appropriations to initiate construction were made in July 1947, prior to completion of the definite project report.

Definite project report completed in October 1948, containing a cost estimate of $14,774,000. Contingencies allowance was 15 percent.

The 1952 fiscal year cost estimate is $19,050,000. As of June 1951 the project was 49 percent completed. Among the reasons for the increase of $12,250,000 from the authorization estimate to the 1952 fiscal year estimate are:

Unforeseen conditions	$1, 913, 000
Inadequacies	3, 560, 000

The cost increase for relocations and lands is substantial. With the relocation program only 1 percent completed, the cost increase for relocations is $5,187,000 or 498 percent. The cost increase in lands, with land acquisition only 29 percent completed, is $2,166,000, or 137 percent.

BALDHILL RESERVOIR, SHEYENNE RIVER, N. DAK.

Authorized in flood control act on December 22, 1944, on an estimate of $810,000 based on the survey report. Estimate for fiscal year 1952 is $2,694,500. Included in this increase are:

Unforeseen conditions	$353, 770
Inadequacies	457, 320
Total	811, 090

It appears therefore that these two items alone equal the amount of $810,000 estimated in the survey report.

Planning money was appropriated in 1945. The definite project report was not completed until May 22, 1947, and estimated construction cost at $2,024,500. Construction money was appropriated in fiscal year 1947 ($300,000) and fiscal year 1948 ($900,000). The latter amount was included in the appropriation act of July 31, 1947. At the time the initial construction funds were appropriated in fiscal year 1947, the cost estimate of $810,000 was based on the survey report.

This apparently illustrates deficient planing in the survey report, which is further borne out by the gross underestimate for lands. The survey report estimated only $208,000 for land acquisition. With 87 percent of this program completed, the cost of lands has increased to $633,400, or 205 percent. The acreage increased 33 percent.

PHILPOTT RESERVOIR, SMITH RIVER, VA.

Definite project report before initial construction funds

The definite project report was prepared before initial construction funds were appropriated. The survey report was printed in 1944 as a House Document in the Seventy-eighth Congress, second session. The total estimated cost of construction was stated to be $5,240,000. This figure was used at the time that Congress appropriated planning funds in fiscal years 1946 and 1947. The definite project report was completed on November 20, 1946, and was approved by the Chief of Engineers on *May 19, 1947*. The completed definite project report showed the estimated construction costs of the project to be $8,780,000. In the appropriation act of July 31, 1947, covering fiscal year 1948, Congress appropriated initial construction funds.

The Corps of Engineers indicates that the increase in this estimate in the succeeding years up to the present figure of $13,120,000 for fiscal year 1952 is accounted for by the rise in construction costs and construction experience. The increase amounts to $7,880,000 over the authorization estimate of $5,240,000. The corps, in compliance with our request, furnished the committee staff figures showing the categories of increase of cost. On this project the $7,880,000 is broken down as follows:

Price changes	$6, 000, 000
Authorized project extensions	300, 000
Structural and engineering modifications	1, 105, 000
Inadequacies	475, 000

It is to be noted that $1,580,000 of this increase is accounted for by structural and engineering modifications and inadequacies, or approximately 20 percent of the *increase*. The single item of structural and engineering modifications amounts to a 21.2 percent increase over the authorization estimate.

The increase between the authorization estimate of $5,240,000 and the definite project report estimate of $8,800,000 (round) amounts to $3,560,000 which is broken down as follows:

Price changes	$1, 890, 000
Authorized project extensions	300, 000
Structural and engineering modifications	1, 105, 000
Inadequacies	265, 000
	3, 560, 000

The increase between the definite project report figure and fiscal year 1952 is entirely attributable to price changes (and a small item for inadequacies, $210,000). Thus, it appears that the definite project report picked up all the structural and engineering modifications and provided sufficient information so that authorized project extensions were not necessary.

It is significant to note, however, that the corps' estimates for relocations and lands were considerably inadequate. Thus the cost increase for relocations was $250,000, which is 312 percent over the corps' survey estimate; the cost increase for lands was $350,000, which is 250 percent over the corps' survey estimate.

At the time that the definite project report was prepared, the corps allowed for contingencies 15 percent of every feature except land, and damages were 10 percent on this latter feature. On the other hand, the corps in the contingency schedule recently furnished the staff stated that in the definite project report of $8,800,000, there was a contingency allowance of only 11 percent, with an addi-

tional 3 percent for inadequacies, totaling 14 percent. The contingency schedule shows that at the time of the survey report the corps had allowed an item of 15.1 percent for contingencies, amounting to $793,000 on $5,240,000.

In the fiscal year 1952 hearings this project is covered at page 586 of part 1. Colonel Potter testified that the benefit-cost ratio at the time of the survey report was 1.3 to 1, whereas it is now down to 1.07 to 1. He explained the decrease in the ratio as accountable to increased costs and in turn annual charges.

In the definite project report at page 28, pragraph 87, this project is stated to be "an integral unit in the comprehensive plan approved by Congress for flood control and other purposes in the Roanoke River Basin."

In the definite project report there appears toward the front a document dated November 30, 1946, and entitled "Comparison of Data Presented in the Definite Project Report on Philpott Reservoir, Va., with that Contained in Project Document." It is shown therein that the benefit-cost ratio dropped from 1.30 to 1 in the project document (the survey report) to 1.10 to 1 in the project report.

SCHUYLKILL RIVER ABOVE FAIRMONT DAM, PA.

Authorized by River and Harbor Act of July 23, 1946 based upon a survey report estimating construction cost to be $12,895,000.

No planning money has ever been appropriated. Four hundred thousand dollars was appropriated for construction in the appropriations act of October 13, 1949.

The survey report estimate was increased by the engineers to $17,000,000 in fiscal year 1950 and 1951. However, the estimate in fiscal year 1952 was decreased to $12,574,000, which is even lower than the authorization estimate by virtue of the completion of the definite project report for the entire project.

This is an excellent illustration of the value of planning either in the definite project report or in a planning report, and shows clearly that estimates by the engineers after the survey report and before planning is completed may not be sound.

BUGGS ISLAND

This project was authorized by the Flood Control Act of December 22, 1944. The construction estimate at that time was $30,900,000 based on the survey report.

Planning money was first appropriated on March 31, 1945. The definite project report was completed on May 20, 1946. Congress appropriated $300,000 for planning and $1,000,000 for construction on December 28, 1945, based upon the survey report estimate. When the planning had been completed, the definite project report estimate was $57,730,000.

Fiscal year 1952 estimate is $88,840,000. Much of this increase is accounted for by price rises and authorized project extensions. These two items totaled $53,700,000.

This is a good illustration of the summary appearing at the front of the definite project report, and of the fact that the definite project report for a project as large as this was completed between April 1945 when definite project studies in the field were initiated until final approval of the definite project report by the Chief of Engineers on May 20, 1946.

CLARK HILL DAM AND RESERVOIR

Authorized in the 1944 flood control act at an estimate of $35,300,000.

A definite project report was completed in December 1945 and approved by Office of the Chief of Engineers in 1946. The cost estimate was $44,332,000. This represents a figure of $9,032,000 over the authorization estimate which is explained thus:

(*a*) The original estimate did not include in its power plant the cost of transformances and switch yard, $2,424,000.

(*b*) Cost of relocations increased $1,842,000.

(*c*) An increase of $1,837,000 is estimated cost of reservoir clearing due to increase in the relative percentage of total reservoir area determined to be wooded.

(*d*) Original estimate did not include cost of providing reservoir recreational facilities, material control, soil conservation, and fish and wildlife estimated to be $1,969,200.

In the 1952 fiscal year hearings, the estimate was set at $78,400,000, an increase of $34,068,000 over the 1946 definite project report. The project is now 66 percent complete.

It is again significant to note that inadequate attention was given to relocations and lands. The cost increase for relocations up to fiscal year 1952 is $3,591,000, or 198 percent. Of this, the definite project report failed to pick up $1,749,000. For lands, the cost increase is $4,144,000, or 306 percent.

FOLSOM PROJECT, CALIFORNIA

Authorized in Flood Control Act of 1944 at an estimated cost of $18,474,000.

A definite project report was completed in February of 1950 quoting a first cost estimate of $51,500,000, including 15 percent contingencies and 12½ percent for engineering and overhead.

The cost estimate used in the 1952 fiscal year hearings was $50,792,000, almost a million less than the 1950 definite project report which had applied current price levels. The project was 18 percent complete as of June 1951.

Accounting in part for the increase of $32,318,000 between the authorization estimate and the fiscal year 1952 estimate are:

Unforeseen conditions	$2, 373, 000
Inadequacies	2, 581, 000
Total	4, 954, 000

The increases for relocations (796 percent) and for lands (270 percent) are inordinately high, and demonstrate the vital need for better planning.

OOLOGAH RESERVOIR

The Oologah Dam and Reservoir is one of the projects included in the general plan for flood control in the Arkansas River Basin, approved by the Flood Control Act of June 28, 1938, at a cost of $8,345,000.

A definite project report was completed in May of 1944. The cost estimate figure was $14,040,000, exclusive of transmission lines. Engineering, overhead, and contingencies were 25 percent.

No funds are requested for 1952 but the estimate is now $31,360,000. This may be explained in part by an additional authorization in 1946 (authorized project extension amounted to $7,736,000). Included also in this price jump are:

Unforeseen conditions	$4, 600, 000
Inadequacies	792, 500
Total	5, 392, 500

Comment.—Since the definite project report for this project has not yet been made available to us, we are unable to determine whether the definite project report picked up any of the $5,372,500 for unforeseen conditions and inadequacies. This figure represents an increase of 62 percent over the authorization estimate. Sound planning should pick up the bulk of unforeseen conditions and inadequacies.

PINE FLATS PROJECT, CALIFORNIA

Authorized in Flood Control Act of 1944 at an estimated cost of $19,700,000.

A definite project report supplement dated August 9, 1948, stated three plans with varying costs: Plan I, $51,200,000; plan II, $50,560,000; plan III, $51,020,000.

The cost estimate for 1952 is $51,121,000. The dam is 43 percent complete. Included in the difference of $31,421,000 between the authorization estimate and the 1952 fiscal year estimate are:

Unforeseen conditions	$9, 382, 000
Inadequacies	9, 329, 000

Comment.—Contingencies of 15 percent were allowed in the definite project report estimate. There is little or no change in the 1952 fiscal year estimate cost over the definite project report cost. This fact again emphasizes the desirability of basing an estimate on sufficient planning.

ST. THOMAS HARBOR, VIRGIN ISLANDS

This is a dredging project authorized in the River and Harbor Act of August 26, 1937, upon a survey report estimate of $743,000. The estimate for fiscal year 1952 is $2,650,000.

No money has ever been appropriated by Congress for this project—no planning money and no construction money—and this project is not listed in the fiscal year 1952 hearings.

This is the type of project for which no definite project report is normally prepared. It is significant to note that the increase between the authorization estimate and the fiscal year 1951 estimate was based in part upon—

Unforeseen conditions	$776,775
Inadequacies	192,825
Total	969,600

The sum of these two categories is 130 percent in excess of the original survey report estimate.

This is a good illustration of the need for a planning report for all types of projects, and particularly for those where definite project reports are not being prepared.

POTOMAC RIVER (WASHINGTON CHANNEL)

Authorized in act of August 30, 1935, based on a survey report estimating the cost at $1,261,000. Estimate for fiscal year 1952 is $6,097,000.

Definite project reports for projects of this kind were not made until 1943 at which time the project was well under way. The definite project report was completed in September 1945 and carried a cost figure of $3,899,000. By that time Congress had appropriated $1,500,000 (round) for construction funds.

The engineers advised us on July 11, 1951, through Mr. Carter Page, that the increase between the definite project reports figure of $3,899,000 and fiscal year 1952 of $6,097,000 is attributed solely to price increases. He stated that this increase greatly exceeds the ENR Index for this period. As a matter of fact, it appears that this price increase is 100 percent greater than the ENR rise.

ORDERS ISSUED BY ENGINEER COMPTROLLER

ENGCO AND
ENGCR 121.6

DEPARTMENT OF THE ARMY,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington 25, D. C., June 22, 1951.

Subject: Cost and finance accounting procedures.

To: Division engineers.
District engineers.
Supervisor of New York Harbor.
Director, Waterways Experiment Station.

1. *Purpose.*—The accounting instructions contained herein are designed to obtain greater uniformity and simplification in existing procedures. While these objectives have been the subject of continuous concern to the Chief of Engineers, the need for consideration of the specific points covered herein has been emphasized by the recent congressional investigation of civil works activities of the Corps of Engineers.

2. *Project cost account structure.*—The subdivision of project cost accounts, as stated in paragraph 35 of chapter I of the Cost Accounting Manual, Civil Activities, is as follows:

(*a*) Projects are subdivided into features.
(*b*) Features are subdivided into subfeatures.
(*c*) Subfeatures may be further subdivided into sub-subfeatures, etc.

Subparagraph d of multiple letter ENGFC 121.6, October 7, 1949, subject: Changes in cost accounting procedures, civil works activities and VA hospital construction, stated that there would be no change with reference to maintenance of prescribed subfeature accounts, but that it was desired that district engineers study the entire cost account structure maintained for the purpose of eliminating any accounts which they consider to be nonessential and which are not prescribed by regulations. It is mandatory that subdivisions of accounts be eliminated where not absolutely essential. For this purpose district engineers will make a detailed survey of the account structure maintained for every civil works (including VA) project under their jurisdiction, and every account subdivision not prescribed by the Chief of Engineers which is considered to be nonessential will be eliminated. There should be a real need for every breakdown, of course, but particular atten-

tion; uld be paid to subdivisions below the level of subfeatures. The survey of the district engineers should be completed as soon as practicable but not later than July 31, 1951. A record of the survey should be maintained which will briefly indicate justification for retention of existing accounts established by the district engineer below the level of subfeature and which will also indicate the accounts eliminated. This record will be held available for review on the first audit or inspection by Office of the Chief of Engineers or division auditors occuring after completion of the district engineer's survey. Thereafter the adequacy of project account structure will be a matter for review by the referred-to auditors within the general governing procedures contained in the Corps of Engineers Audit Manual.

3. *General district office expenses.*—The intent of the instructions contained in paragraph 5 of multiple letter ENGCO 121.6, July 19, 1950, subject: Changes in cost accounting procedures, civil works activities and VA hospital construction was to indicate methods by which costing of division and district office expenses could be simplified. The purpose of charging division and district office costs of a general nature such as heat, light, power, telegrams, telephone and teletype rentals and toll charges, depreciation of general office equipment, general offices supplies, etc., to account 20, general, is to eliminate to the most practicable extent complicated computations and detailed analysis of invoices and receiving reports. It is the intent of these instructions that all such costs incurred in the division and district office proper, referred to in the preceding sentence, will be considered as costs of a general nature to be charged to account 20, for subsequent distributions to the division and district office functional cost classifications on dollar and/or other equitable bases. Telephone, teletype, and telegraph charges are for inclusion as general charges, in order to save the continuous detailed analysis of the many small charges involved in the services received. "General office supplies" was defined in the above-referred-to paragraph 5. These instructions are also applicable to military cost accounting (account 50) and the provisions of Circular Letter No. 4433 (fiscal No. 445), July 1, 1948, subject: Cost accounting, division and district office expense, etc., military and civil works, are modified accordingly.

4. *Labor charges*—a. *Division and district office engineering, operations, and real-estate functions.*—It is provided in paragraph 76.a. (7) of chapter I, Cost Accounting Manual, Civil Activities, in respect to the operation of the district office, general engineering and operations expense account, that costs will be charged directly to specific features of work whenever practicable. For this purpose, commencing no later than July 1, 1951, no time of district office engineers, draftsmen and others of less than one-half day (4 hours) will be charged directly to feature accounts, etc. Paragraph 76.a. (10) of chapter I of the Cost Accounting Manual, relative to real-estate expense is changed to apply a similar 4-hour limitation thereto for district office personnel. The 1-day limitation for division office engineering, operations, and real-estate personnel, contained in the referred-to paragraphs 76.a. (7) and (10), remains unchanged. These instructions are also applicable to military cost accounting, and the provisions of Circular Letter No. 4433 (fiscal No. 445), July 1, 1948, subject: Cost accounting, division and district office expense, etc., military and civil works, are modified accordingly. The instructions in the following subparagraph relative to charges in multiples of 1 hour are equally applicable to this subparagraph, subject to the above 4-hour limitation.

b. *District field employees.*—In the case of such employees, labor charges will be made in multiple of full hours only. That is, charges for working time will be rounded off to the nearest whole hour, but care will be exercised to account for neither more nor less than the whole working period. This determination implies that no separate charges will be made for insignificant contributions of time which amount to less than half an hour per working day and that such minor contributions of time will be absorbed by charges to activities whose time is raised to the nearest full hour. These instructions are applicable to both military and civil activities.

5. *Cost of Mississippi Basin model and of civil works investigations program.*—a. Such costs billed to districts will be prorated to civil works projects on the basis of the total construction funds (major capital outlay less planning funds) allotted for the appropriate projects, after the appropriation act has passed and funds for the year have been allotted.

b. Bills to districts from the Chief of Engineers for the civil works investigations program will indicate the amount to be charged to each appropriation, and

distribution to projects under those appropriations will be made on the basis indicated in subparagraph a, above. Bills to districts for Mississippi Basin model expense will be distributed to both FC–general and FC–MR&T projects, also on the basis indicated in subparagraph a., above.

c. The costs will be charged to the cost account for special investigations and consultants, under construction engineering and design (preliminary work). For types of projects where the referred-to account is not maintained the Mississippi Basin model costs and civil works investigations program costs will be charged to separate accounts under the appropriate projects.

6. *Land acquisition.*—In some cases obligations are being recorded against allotted funds on the basis of civil works land-acquisition programs or other informal estimates prior to obtaining options or instituting condemnation proceedings. Such action results in overstatement of obligations in accounts and reports and must be discontinued at once. The provisions of paragraph 5.o. (2) of the District Finance Accounting Manual must be observed in all instances with respect to recording obligations for civil works land acquisition.

By order of the Chief of Engineers:

CRAIG SMYSER,
Lieutenant Colonel, Corps of Engineers, Executive.

DEPARTMENT OF THE ARMY,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, D. C., June 28, 1951.

ENGCO, 121.6

Subject: Cost Accounting—Division and District Office Expense—Military and Civil Activities (including VA construction).

To: Division engineers.
District engineers.

1. In order to simplify cost-accounting procedures, effective July 1, 1951, the present cost accounts for division and district overhead, general engineering and operations expense, and real-estate expense, will be consolidated into one new account entitled "Division and District General Overhead." Separate accounts will be maintained for civil and military work as heretofore. The division and district general overhead account will be subdivided into the same functional subaccounts now maintained for the three discontinued accounts, as listed in paragraph 4 of multiple letter ENGCO 121.2, July 13, 1950, subject: Cost Budgeting—Civil and Military Works, except that only one subaccount to absorb the portion billed by the division office will be maintained by each district.

2. Predetermined division and district general overhead rates will be computed in the manner prescribed for division and district overhead in paragraph 80 of chapter I, cost-accounting manual (civil activities), and in paragraph 4b of Circular Letter No. 4433 (fiscal No. 445), July 1, 1948, subject: Cost Accounting—Division and District Office Expense, etc.—Military and Civil Works. Any balances in the discontinued accounts as of June 30, 1951, will be transferred to the division and district general overhead account.

3. The new account will be reported on the project cost summaries for the plant allotment (or equivalent, for civil works) and for district office expense (military) in the same manner as the superseded division and district office overhead account. Normal approved procedures will be followed in respect to making charges direct to features of work, etc. Reporting of division and district office expenses on ENG Form 1839 will continue as required by paragraph 7 of the multiple letter referred to in paragraph 1 above.

4. The indirect cost items A. l. d. (1), (3), and (4) in cost breakdown (enclosure to multiple letter ENGCO 121.6, April 12, 1950, subject: Cost Analysis—R & H and FC Works as changed by multiple letter of the same symbol and subject, dated April 28, 1950) will be consolidated and reported as item A. l. d. (4), Division and District General Overhead. The titles of account 804 (chart of accounts attached to multiple letter, ENGCO and ENGMT 121.6, April 13, 1951, subject: Cost Accounting and Cost and Progress Reporting for Military Construction and Other Activities) and of account 807 (chart of accounts attached to Circular Letter No. 4375 (fiscal No. 433) (Military Construction No. 81), September 3, 1947, subject: Cost Accounting, "Veterans' Administration Hospital Construction Program") are changed to "Division and District General Overhead." For all military construction jobs reported under "Current work" on cost Form 39A, the

costs of the discontinued accounts previously charged to inspection and supervision, engineering, etc., will be transferred therefrom and included in account 804. Similar adjustments will be made in civil-works accounts, VA accounts, and others to the necessary extent so that the new account will be inclusive of all appropriate costs.

5. It is intended that the cost reporting instructions contained herein will be applicable to cost reports submitted for periods subsequent to June 1951. No change is desired in the reports for June 1951.

By order of the Chief of Engineers:

CRAIG SMYSER,
Lieutenant Colonel, Corps of Engineers, Executive.

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